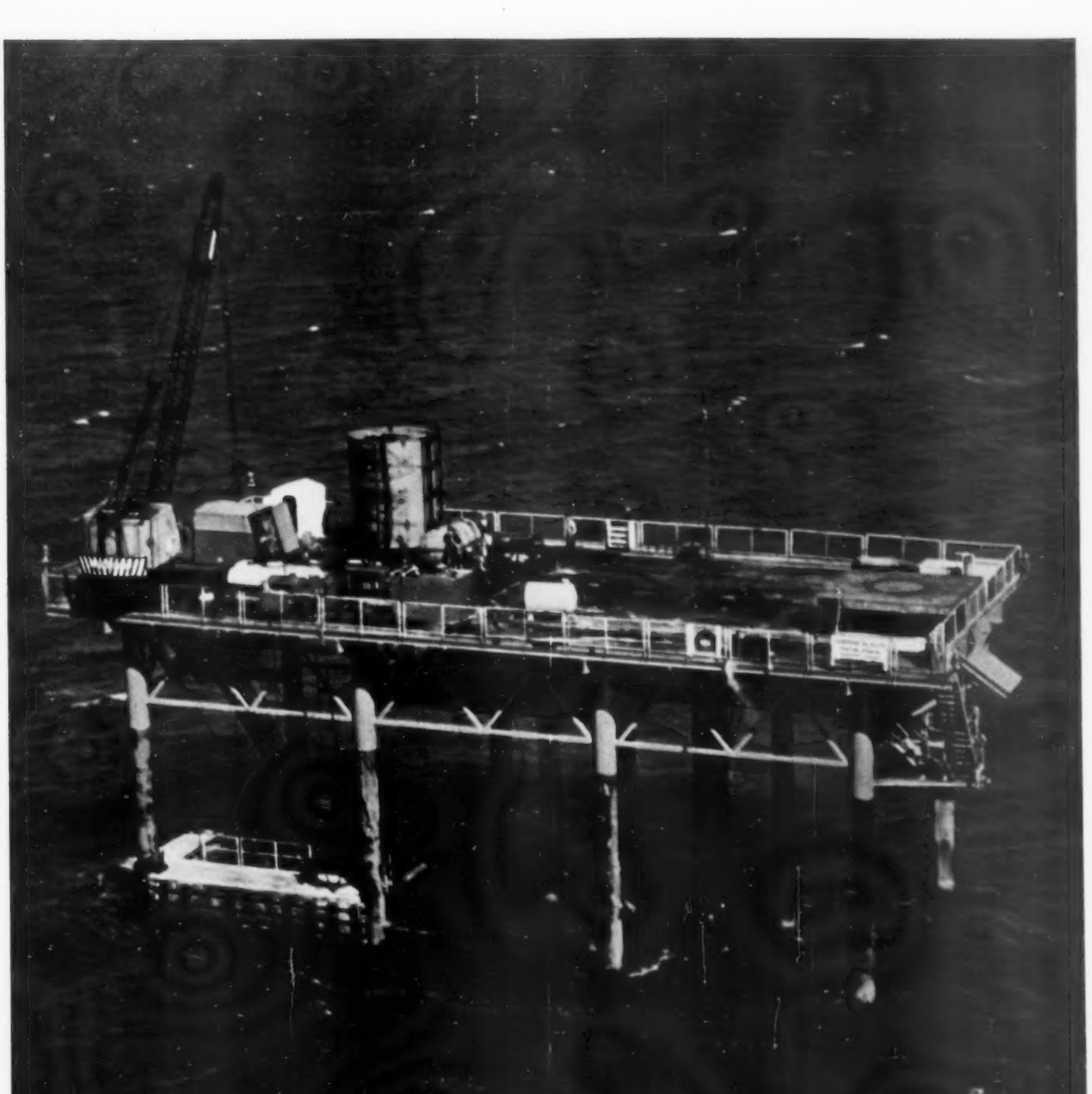
WORLD PETROLEUM

AUGUST, 1961



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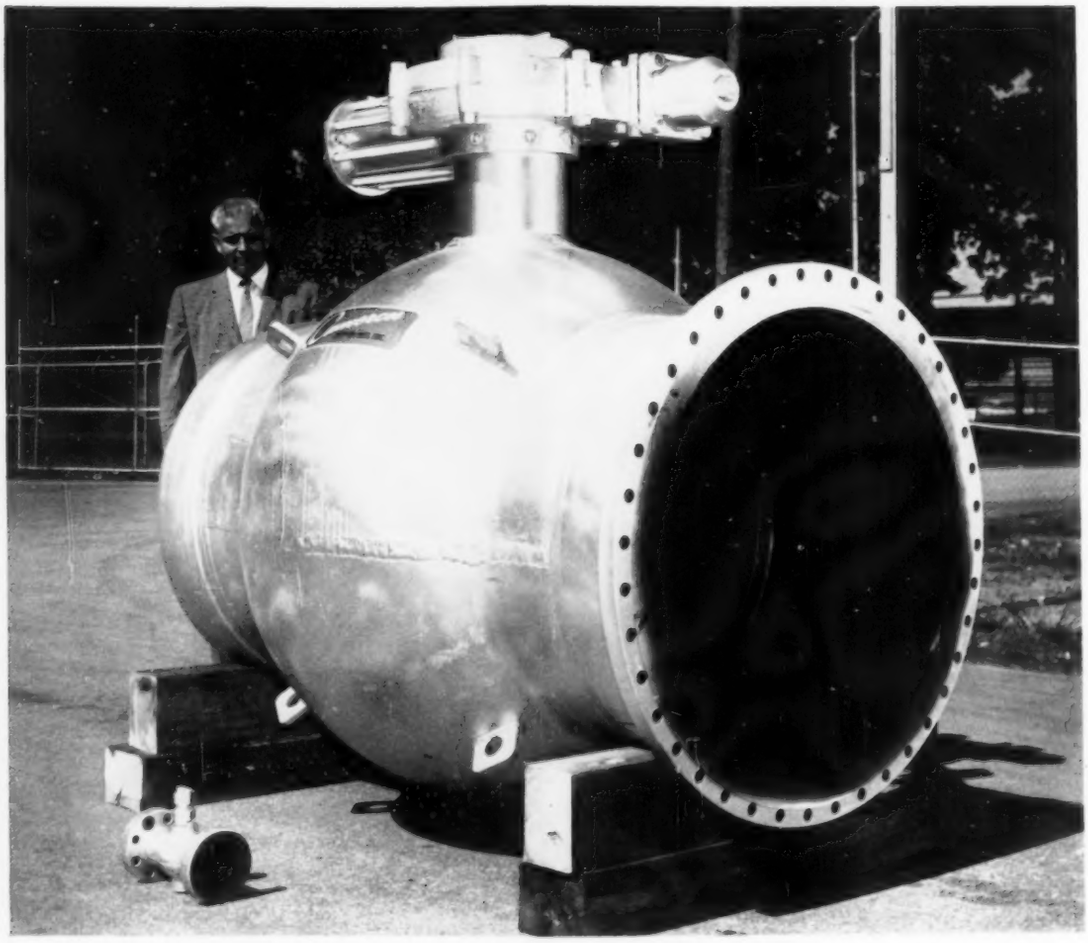

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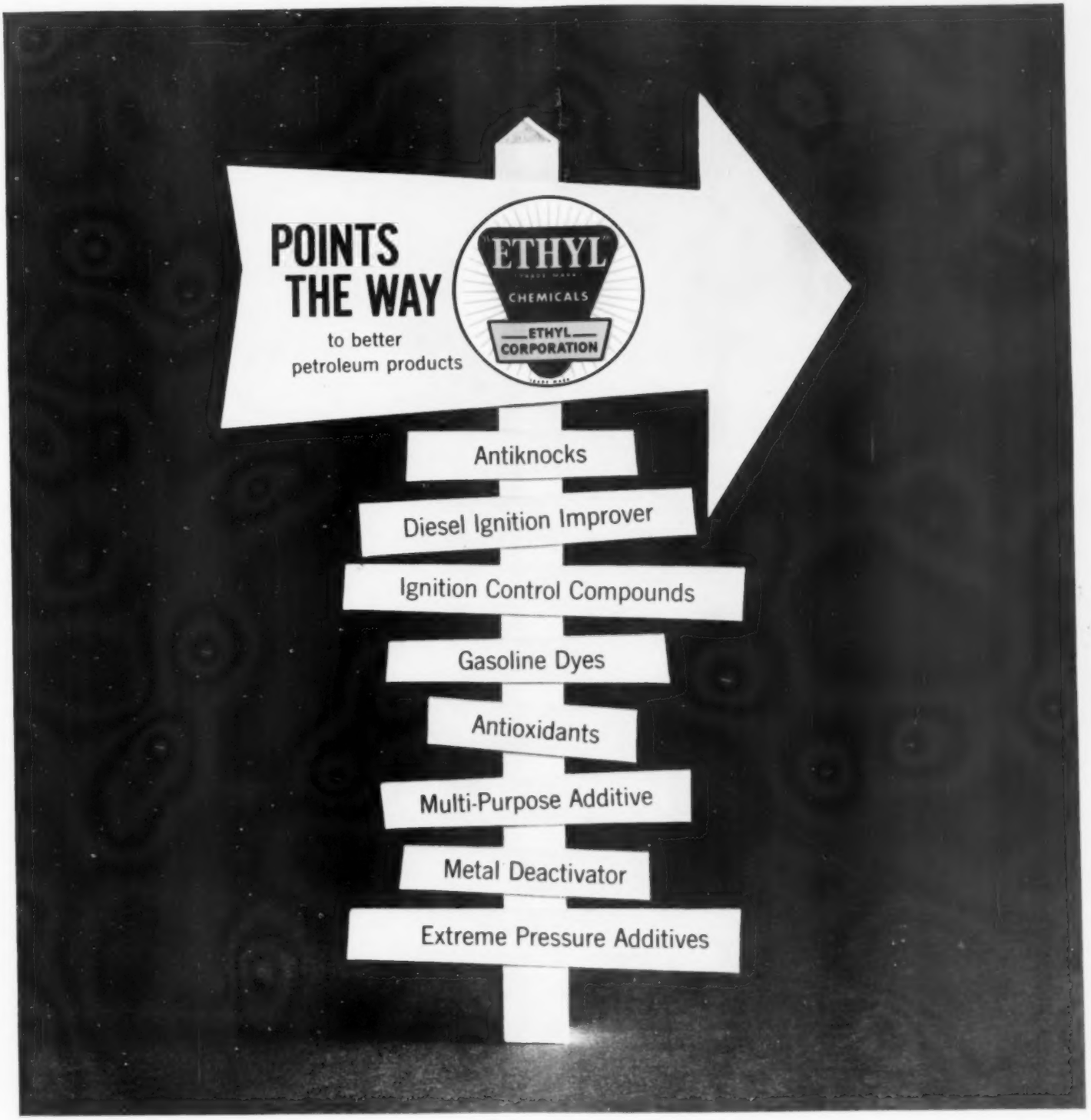

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LUMMUS

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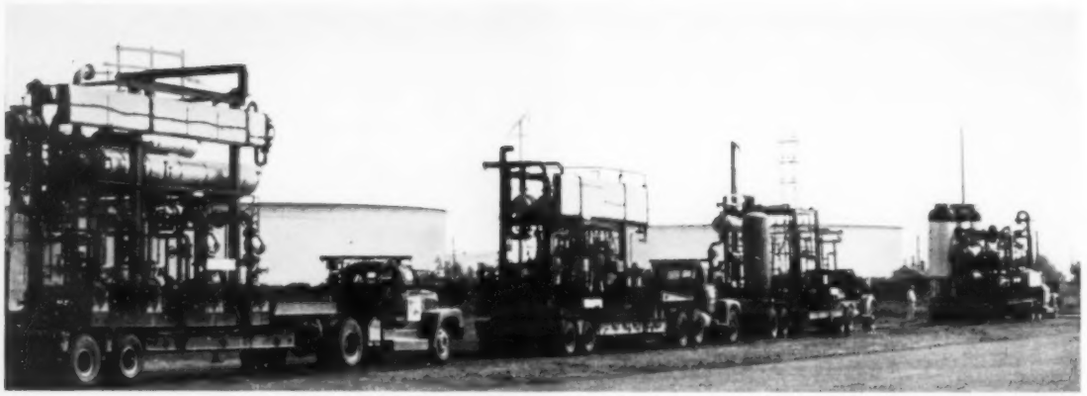
Central America's First Oil Refinery Is Largest Prefab Oil Refinery Ever Built



The largest skid mounted oil refinery ever constructed has just been installed near Puerto Matias de Galvez, Guatemala, for the Breaux Bridge Oil Refining Company, Inc.

This 4,000 barrel-per-day refinery was designed by the Houston office of The Lummus Company to meet an unusual set of conditions in the rain forests of Central America.

Because of a shortage of labor in the area, Lummus found it impossible to follow its usual practice of employing local craftsmen. In addition, an average of 190 inches of rainfall per year pointed to excessive difficulties in on-site construction. These conditions, coupled with the relatively small size of the process units, suggested the use of prefabricated refinery units that could be built in the United States and shipped to Guatemala.

The refinery consists of atmospheric distillation, naphtha desulphurizing, and catalytic reforming processing units, together with the necessary supporting offsite facilities.

Lummus evolved the plan of mounting pumps, compressors, exchangers, accumulators, etc., for the various process units on steel skids. Large vertical process towers, due to shipping limitations, could not be skid-mounted.

The plant was carefully designed so that when assembled and completed it could be easily operated and maintained. The design resulted in the use of seven process equipment skids—four are pictured above—plus two compressor skids.

Prefabricating and prepackaging techniques were also used in the design and transporting of heaters, boilers, electric generation equipment, water system pumps, and even refinery personnel housing.

Lummus felt that this design concept had many advantages. Design, procurement, and construction schedules could be overlapped to a much greater extent than usual, resulting in a shorter completion schedule and many economies. Also, better quality control could be maintained. Construction was completed in 10 months after clearing of the dense jungle jobsite. It is estimated that the same refinery, constructed by conventional means, would have taken about 15% longer, and because of the necessity of importing craftsmen for the distant jobsite, it would have cost about 10% more.

The portable plant technique is one that Lummus knows well. Ten years ago, the company built a similar, but smaller, skid-mounted portable refinery for the U. S. Navy. Lummus has also designed and constructed transportable pilot plants for the Wulff acetylene process, a refinery pilot plant, an atomic reactor test loop, and a nitrous oxide unit among others.

If you have a construction problem which might be solved through this technique, Lummus would be pleased to discuss it with you.

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York, Houston, Washington, D. C., Montreal, London, Paris, The Hague, Madrid; Engineering Development Center: Newark, N. J.

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World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

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THIS MONTH'S COVER

is an air view of operations off Padre Island in the United States. The photo was taken by a Halliburton crew while on a permanent well completion job. Our thanks for its use go to Malcolm E. Rosser III, editor of The Cementer, house magazine for Halliburton Oil Well Cementing Co.

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by Joseph B. Huttlinger

Import Appeals Board Shifts Approach

The Oil Import Appeals Board, which for nearly two years was turning down requests for larger oil import quotas almost automatically, may be embarked upon a new tack.

In handing down nine decisions recently, the board granted relief in four instances, and rejected only nine companies. This is a marked change from the past, which saw relief in only nine of the first 200 petitions filed with the board.

The board's latest actions will boost total oil imports by only 4,902 b/d directly, but they set precedents that will undoubtedly boost imports at least 15,000 b/d in the near future.

The board gave relief to Crown Central Petroleum Corp., and Danaho Refining Co. after earlier decisions on basically the same facts, had rejected any relief. This indicates basic changes are in the making.

The board's change is attributed to a change in its membership from three Eisenhower appointees to three appointees from the Kennedy administration from the Departments of Interior, Defense and Commerce.

There is no sign that the board is ready to give relief to all who ask it or even to allow in totals of imports that would weaken the import control program. At the least, the new appeals board is stimulating new interest in use of the appeals route, and thus more business for itself. And, it may turn out that a company really hurt by the import program can get some relief.

The Canadian Question

One of the tough decisions facing U. S. officials who control oil imports is this: What do we do about the rise in imports from Canada?

At the moment, all oil imports from Canada are exempted from the control program. As a result, they have risen from 46,000 b/d of crude oil in 1955 to a new high of 170,355 b/d of crude oil in May. Imports of finished products in May added another 5,033 b/d.

Almost each month, imports from Canada have been reaching new peaks. As a result, the goal of Canada's Borden Commission two years ago is well on its way to realization. At the time it came out, the Borden Commission's goals for production and for exports seemed too high.

The Borden Commission, after an exhaustive study of Canadian energy, proposed a goal for crude oil exports to the USA of 180,000 b/d by 1965 as a minimum and 260,000 b/d as a maximum. Now it appears, four years ahead of time, the bottom goal has been just about reached.

The goal called for exports to the US Mid-Continent areas of 78,000 to 110,000 b/d; and to the West Coast of 102,000 to 150,000 b/d.

Against these goals, actual exports of Canadian crude in May were 81,132 to the Mid-Continent area and 89,223 to the West Coast. So, the Canadian exports to the Mid-Continent have been the surprise in the picture.

There are many reasons why Canadian oil flows to the Mid-Continent areas have advanced more rapidly than expected. For instance, the Ashland Oil refinery in the Buffalo, N. Y., area which never had used Canadian crude oil, by the middle of 1961 was using about 10,000 b/d of Canadian crude.

Officials on both sides of the border are aware that the situation is reaching a critical point. They have warned that the Canadian oil movement to the U. S. must not rise too fast. But they also see the day coming when hard and firm action must be taken. That action could come in the forthcoming revision of the oil import program expected well before the end of this year.

U. S. independent producers are becoming more and more alarmed. They favor free movement of Canadian oil to the U. S., but they want it used to reduce total allowed imports. Otherwise, they say, each barrel of Canadian oil takes the market of a barrel of U. S. oil.

Pipeline

The Federal Power Commission

President John F. Kennedy now has named a majority of the members of the five-man Federal Power Commission. The first two nominees—Joseph C. Swidler of Tennessee and Howard V. Morgan of Oregon—were sworn into office June 28, and began serving at once. Kennedy's third nominee, Lawrence J. O'Connor, who has been Oil Import Administrator at the Department of the Interior, was to take office in July or August, upon Senate confirmation.

Swidler is to take over the chairmanship of the commission on Sept. 1, 1961, after a deal between him and the present chairman, Jerome Kuykendall. There are reports that Kuykendall may resign from the commission before the end of his term, which comes next year. The fifth member, Frederick Stueck has several years more left in his present term.

Swidler and Morgan both have public power backgrounds and O'Connor has a background of oil and gas. He was born in Tulsa, Okla., grew up in Butler, Penna., took degrees from Rice University and Harvard University. He worked in Houston, Texas, with the accounting firm of Haskins & Sells, and in 1945 joined Goldston Oil Corp., rising to vice-president and treasurer. In October, 1958, he became an independent consultant, and joined the Department of the Interior in the middle of 1959 as assistant director of the Office of Oil and Gas. Then, he was moved to Oil Import Administrator.

Some "liberals" in the U. S. Senate began sniping at O'Connor on the ground that his oil and gas background makes him unsuited to serve on the commission. But Kennedy forces replied that the commission historically has had at least one member who understands and is sympathetic with the oil and gas industries.

Before the end of this year, it is widely expected that the FPC will undertake a new study of some sort of independent producers of gas in order to try to figure out how to control their prices.

And, there is more than a little chance that the FPC may vote to drop all price controls over thousands of small independent producers of gas while going in for top to bottom price control over the 250 or so largest producers of gas. The theory is that if the bigs are regulated "strictly," this would set a pattern of prices for all producers. This is the proposal of President Kennedy. But this proposal, too, has many demerits.

Venezuela's Views

Dr. Juan Pablo Perez Alfonso, Venezuela's minister of mines and hydrocarbons, points out that Venezuelan crude oil prices have been driven down 17.5% since the start of the U.S. oil import program.

He said this at face to face meetings with Secretary of the Interior Stewart L. Udall and Assistant Secretary of State Edwin M. Martin in June. He left documents with the officials which showed:

1. Average wellhead prices for Venezuelan crude have dropped from $2.52 a barrel in 1958, the year before the import program began, to $2.18 a barrel in 1960. The price was $2.09 a barrel in 1950.

2. U.S. average prices fell much less, from $3.01 a barrel in 1958 to $2.92 in 1960. It was $2.51 in 1950.

3. The net result is that the spread, which was 49¢ a barrel before the program, has grown to 74¢ as of last year, a gain of 50%. The spread was 42¢ in 1950.

4. Venezuela's oil imports to the U.S., too, have grown from 396,000,000 barrels in 1958 to 423,000,000 barrels in 1960. They were 223,000,000 barrels in 1950.

5. The net result was that the U.S. gained $194,000,000 in its oil trade with Venezuela in 1958 (the exports times the spread) and a whopping $313,000,000 in 1960. The figure was $94,000,000 for 1950.

6. While Venezuela's oil production and exports have continued to climb, total revenues from oil have not risen accordingly. And, from 1959 to 1960, Venezuelan petroleum revenues actually dropped, while the U.S. share of income from Venezuelan oil rose.

U.S. officials promised to consider the views of the Venezuelan official, who was accompanied by Dr. Jose Antonio Mayobre, Venezuelan Ambassador to the U.S., and Dr. Carlos Perez de la Cova, petroleum counselor at the embassy.

Assistant Secretary of the Interior John M. Kelly said the visit was "particularly timely" as U.S. officials are in the midst of an overall review of the U.S. oil import program.

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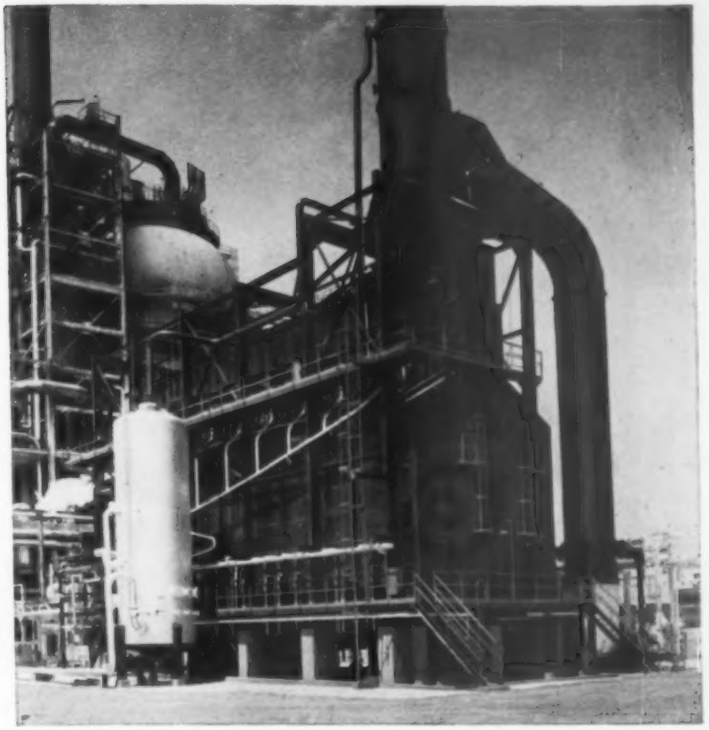

Heater for Humble's Bayway Refinery, Linden, N. J. Large capacity, high thermal efficiency. Specially designed integrated heater, air preheater, auxiliaries and stack in compact design occupy minimum space.

Lummus Oil Heater for Humble's Bayway Refinery meets three tough design requirements

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Secondly, Humble wanted a high thermal efficiency, 86% as compared with the usual 75-80%. In the Lummus design, the heater utilizes Ljungstrom Air Preheater and integrated blower and duct system to attain high thermal efficiency. Operating performance has been consistently high. Humble's big fuel savings have more than made up for the slightly higher capital investment for air preheat equipment.

Finally, there was one other difficult design condition. The new heater would be required to operate for long periods without shutting down for maintenance or cleaning. The Lummus design included steam soot blowers which have kept both the bare tubes and studded tube in the convection section clean. The heater fires on heavy residual fuel oil having a very high solids content.

Lummus designs horizontal and vertical tube oil heaters to any size from 100,000 to 300,000,000 BTU/Hour for any process, anywhere in the world. Because Lummus offers *every* type of oil heater, you can be sure that we will recommend the *right* unit for your needs. Consult with Lummus on your next oil heater—large or small.

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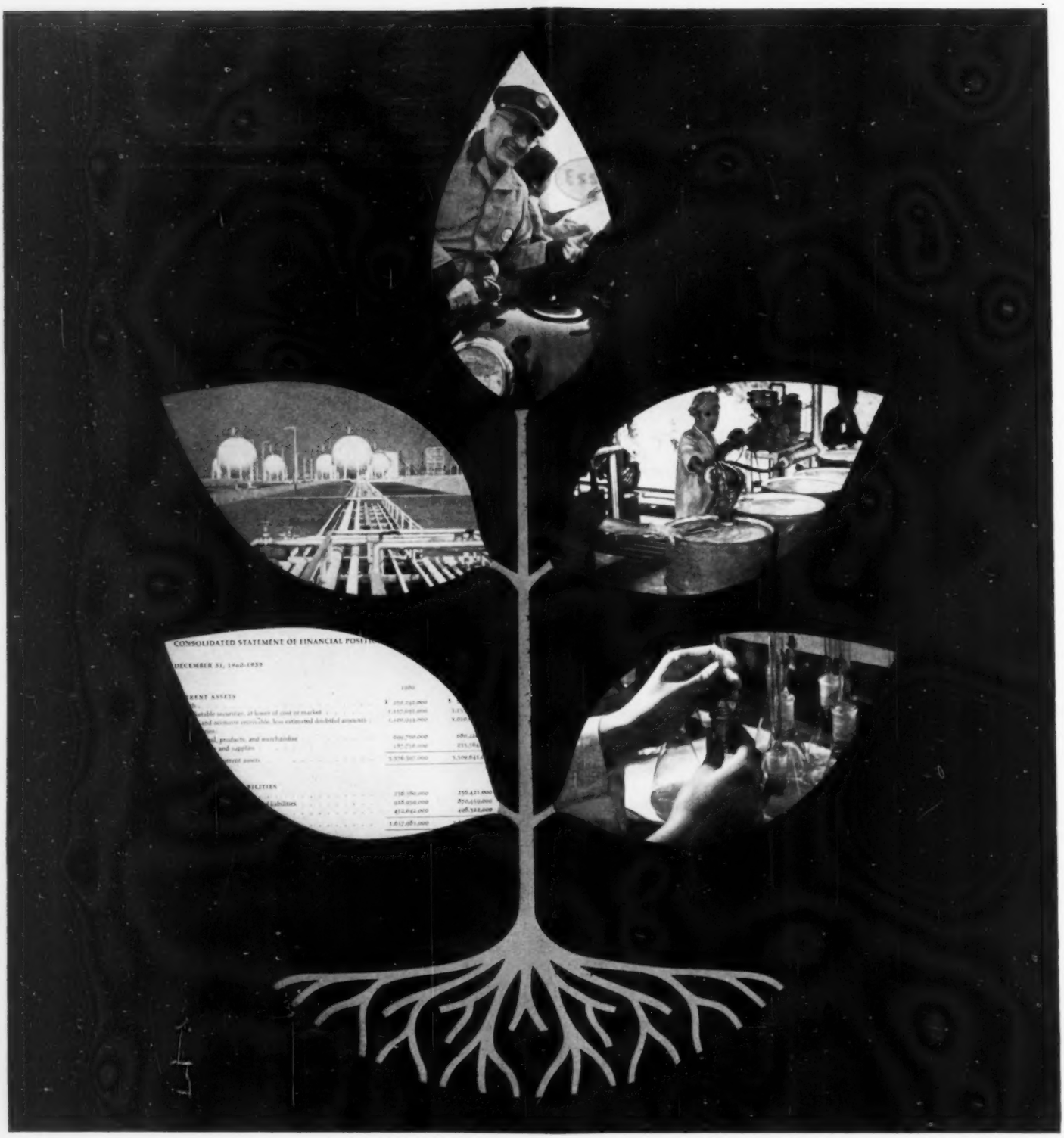

"The oil business is a growth business. The world's need for oil and the things which come from oil is insatiable, and we see no end to a climbing demand. Companies with first-class physical, financial, and human resources, and a dynamic confidence in the future, will share fully and profitably in the great opportunities ahead." *– M. J. Rathbone, President*

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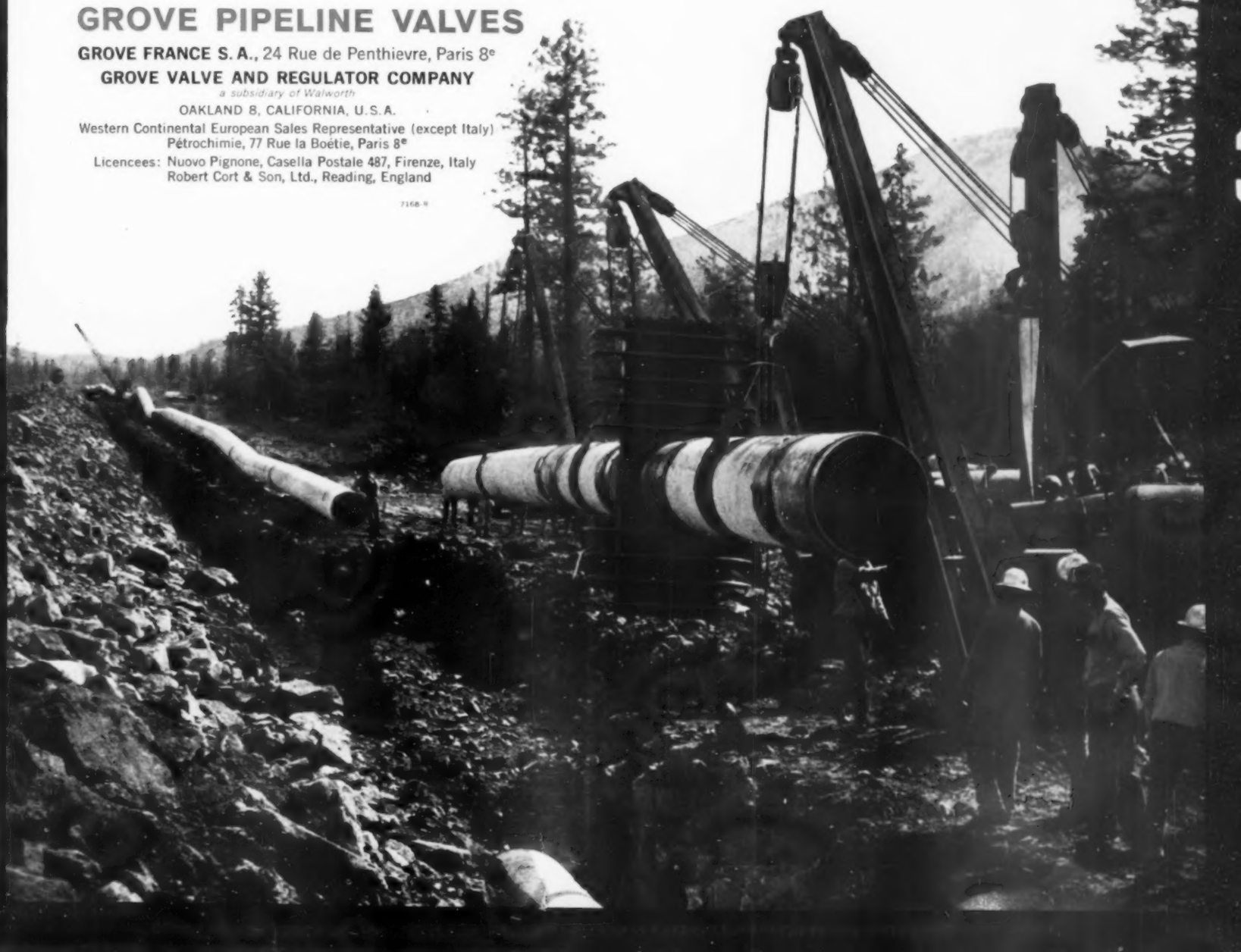

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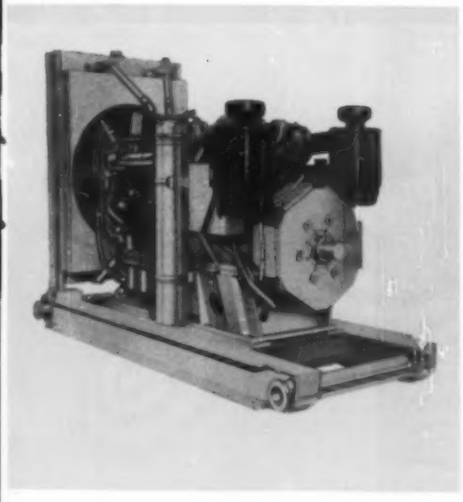

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CUMMINS

U.K. Oil Consumption Up 9.2%

UK deliveries of petroleum products (excluding foreign bunkers) into inland consumption in the first quarter of 1961, at 12,259,683 (long) tons, showed a rise of 1,031,123 tons (9.2%) over the same period of 1960. Comparing earlier corresponding periods, there are signs of a flattening of the rising curve of total consumption: thus the 1960 period total of 11.2 million tons showed a rise of 2.0 million tons (21.7%) over the 1959 total, while the latter period total (9.2 million tons) was an increase of 1.5 million tons (19.7%) over the 1958 total.

Details published by Petroleum Information Bureau on behalf of the UK Petroleum Industry Advisory Committee from returns independently collated can be summarized thus:

U.K. OIL CONSUMPTION

	January to March 1961 (1,000 long tons)	1960	Difference in percent
Aviation fuels	452	388	+16.5
Motor spirit (a)	1,811	1,646	+10.0
Industrial (b) and white spirits	97	97	0.0
Kerosine	552	626	—10.2
Diesel engine road fuel	683	619	+10.3
Gas/diesel oil	1,138	1,011	+12.6
Fuel oil (c)	1,324	5,795	+ 9.1
Lubricating oil (d)	241	236	+ 2.1
Paraffin wax/scale	13	14	— 7.1
Bitumen	270	232	+17.2
Chemical and light dist. feedstocks	564	469	+20.3
Propane/butane and refinery gases	115	96	+19.8
Total	12,260	11,229	+ 9.2

Notes: (a) Includes motor benzole. (b) Includes industrial benzole. (c) Includes refinery consumption: 1961—893; 1960—817. (d) Includes grease.

The detailed figures show the 10% rise in gasoline deliveries to be made up of a 19.2% rise in premier grades—to a total of 1,241,613 tons—and a 5.8% drop in standard grades to 569,623 tons. In fact the latter now account for less than a third of total gasoline used.

Comparing again corresponding periods for earlier years, there are definite signs of a slowing up of fuel oil deliveries; for that of 1960 over 1959 was 28% and for 1959 over 1958 it was 37%.

ICI's Entry into Oil Refining

"By having a refinery of our own," says S. P. Chambers, CB, chairman of Imperial Chemical Industries, referring in his annual review to the decision to build a 1 million tons/year crude distillation unit, "we are ensuring against the possibility that the price of the special oil fractions we need as chemical raw materials might in the future increase to a greater extent than the price of the basic petroleum commodity, crude oil."

This will be unlike an ordinary refinery, he said, in that its main object will be to provide a substantial part of the petroleum fractions used as raw materials in the manufacture of synthesis gas and of many other chemical products. The fuel products will be, from ICI's point of view, byproducts and will be taken back by the crude supplier.

Referring to the replacement of plants producing synthesis gas from coke by plants using processes which start from oil, Mr. Chambers said:

"This changeover from coal to oil is in line with a world wide trend and is not to be attributed to the high cost of coal. The particular new processes which we have worked out are technically so much more efficient that we would adopt them and abandon coal as our raw material even if the coal cost us nothing. By using these processes we expect to reduce our costs, particularly of nitrogenous fertilizers substantially, and to be fully competitive both in home markets and natural gas or oil refinery gas."

"Jet" Acquired by Continental Oil

The US independent, Continental Oil Co. has acquired all the shares of Jet Petroleum Ltd. Jet had 400 retail outlets selling both premier and standard grade gasolines at around 6d/gal below major distributors' prices and who spoke of trebling this number by the end of this year. Permission is also being sought to build a terminal at Blyth to further facilitate distribution over the north-east area, where supplies at present have to be brought from Leeds.

Continental's offer had been accepted, he said, because it would provide capital and solve Jet's greatest problem, ensuring supply continuity through the US company's Libyan oil discovery. Continental recently also acquired a German group stated to have 300 gasoline stations and has made an agreement with Deutsche Erdoel AG to supply crude to DEA refineries in Germany. Earlier this year it formed Condea Petrochemie jointly with the same company for the production of alcohols from petroleum in Germany.

Liquid Methane Importation

The Gas Council has sent to the Minister of Power for approval a scheme for the importation of liquid methane into the UK drawn up in conjunction with Conch International Methane Ltd. and the French authorities responsible for developing Hassi R'Mel gas field. The latter have agreed on the terms of a contract for supplying 350 million therms (about 700,000 tons) a year of North African liquid methane from Port Arzew to Canvey Island in the Thames Estuary.

Two ships, each of 11,000 tons liquid methane capacity, would be built in British yards to transport the methane and initially its gas would be transmitted to seven area gas boards. In calorific value, it is generally regarded that the above annual amount of methane would represent about 1¾ million tons of coal, but the Minister of Power has said that an estimate based on the theoretical coal equivalent of a given amount of methane can be misleading: "imported methane would replace some coal gas (he said). It would also supplant some oil for gas making and, as an enriching gas, enhance the value of 'lean' gases produced from coal."

The Gas Council chairman has said that this scheme could mark the beginning of a new phase in the development of the gas supply industry. It could be developed in about three years to provide at least 10% of the gas at present supplied to the public.

The minister is faced with a very difficult question of national fuel policy to decide, especially as the National Coal Board is strongly opposed to the scheme. It believes that town gas can be made from coal by total gasification at a price below that paid for methane importation, provided Lurgi plants capable of using much larger quantities of coal—such as one million tons a year—are built.

Total's Prefab Filling Station

Total Oil Products (G.B.) Ltd. has now opened its 50th filling station and expects to reach its 100th by December—that is, within a year of opening its first British station for the Cie Francaise des Petroles group. From London these now stretch to Worthing on the South Coast, and from Manchester the company is pushing down into the West Midlands. In addition a number of bulk contracts have been negotiated. Construction is proceeding of a £250,000 ocean terminal and storage depot at Stanlow near Manchester and of a London depot at Fulham.

The first automatic car park in the City of London, holding nearly 500 cars and to be opened shortly, will have a total station attached to it, and the company has acquired a direct interest in a car park being built in Leicester holding over 1,000 cars. Other new developments announced are the provision, where forecourt space permits, of a "do-it-yourself" area for motorists with many facilities, including a vacuum for interior car cleaning, and the use of a new type of hoze nozzle which makes tank overfilling impossible.

Total has introduced the first prefabricated filling station in Britain of mainly timber construction and two such stations had been erected by the end of May. All building components are brought ready-made to the site, including plumbing and electrical fittings, and it is stated that this prefabricated building takes three to four weeks to erect and complete against 12 to 14 for one constructed by traditional methods.

Appointments

H. E. SNOW, CBE, deputy chairman and a managing director of British Petroleum Co., has been created a knight in the Queen's birthday honors.

G. PETERS, who since 1955 has been with the Iranian Oil Consortium as head of the operations division at Abadan refinery, has been appointed works general manager of British Hydrocarbon Chemical's new Baglan Bay works in South Wales. Before joining the consortium, Mr. Peters was for three years works manager for BHC at Grangemouth.

A. A. BARR, C. E. R. MILLIDGE, L. G. PACKHAM and **J. A. V. WATSON, OBE,** have been appointed to the new post of assistant managing directors of Castrol Ltd., to take effect from January 1 next.

M. Willcocks, OBE

M. WILLCOCKS, OBE, manager since 1958 of the industrial planning department in Shell Refining Co.'s head office, a special assignment, has been made manager of the 2.4 million tons/year Shell refinery at Geelong, near Melbourne, in Australia. His services with the group go back to 1936 and his refinery managerial posts have included Suez, Shell Haven and Heysham.

CAPTAIN J. C. NETTLESHIP has been appointed commodore of the Shell fleet and has joined the new flagship, the 65,000 dwt Serenia. He succeeds **COMMODORE J. F. RUMBELLOW, OBE,** who has retired after 42 years' service.

R. O. Keyworth

J. B. Bryce

J. B. BRYCE, who has been Mobil Oil Co.'s chief engineer (marine trade department) since 1954, has been appointed technical adviser to Socony Mobil Oil's marine sales and international accounts department. He is succeeded by **R. O. KEYWORTH,** marine branch manager at Liverpool.

Pioneering with the Oil Industry in

NORTH AFRICA

With another major pipeline well under way, Bechtel extends to North Africa the leading role it played in Middle Eastern oil developments.

The current project—one of three for Bechtel in North Africa in recent months—is a 30-inch pipeline to Marsa el Brega on the Mediterranean across the desert from newly discovered oil fields at Zelten in Libya. The client is Esso Standard (Libya) Inc., Standard Oil Company (New Jersey) affiliate.

Bechtel is constructing the pipeline and parallel highway; a Bechtel-managed joint venture is building a marine terminal and supporting facilities for the pipeline and oil field operations.

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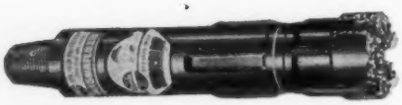
SERVCO TOOL GUIDE

8 ways to lower drilling costs



JUNK MILLS Tough, rugged tools for chewing up bit cones, packers, drill pipe, junk of all kinds—at rates that make fishing uneconomical.

SECTION MILLS Mill any length section at rates up to 4′ per hour. Often complete window cut with one set of arms. Mill all weights of casing from 5″ to 13⅜″ O.D.

HOLE OPENERS *Rock Bit Type:* Opens hole up to twice the bit diameter in hardest formations. Also, *Blade Type* increases hole diameter up to 17″, simultaneously with drilling, in soft to medium formation.

PILOT MILLS Mill wash pipe, casing, liner, liner hanger, drill pipe or tubing at rates up to 10′ per hour; drill collars up to 2′ per hour. The perfect tool for swaged casing completions.

TAPER MILLS Mill collapsed casing, enlarge holes through adapters or retainers, mill out dented casing, and for general reaming.

ROTARY SHOES Difficult washover and milling jobs completed in a fraction of the time required by conventional shoes. Tooth type to cut formation; perforated type to cut iron and formation.

REAMER-STABILIZERS Keep hole to gauge in the roughest, sharpest sands. Save rig time and money by eliminating double drilling and separate reaming operations. SERVCOLOY "W" resists wear 5 to 10 times better than conventional hardfacing.

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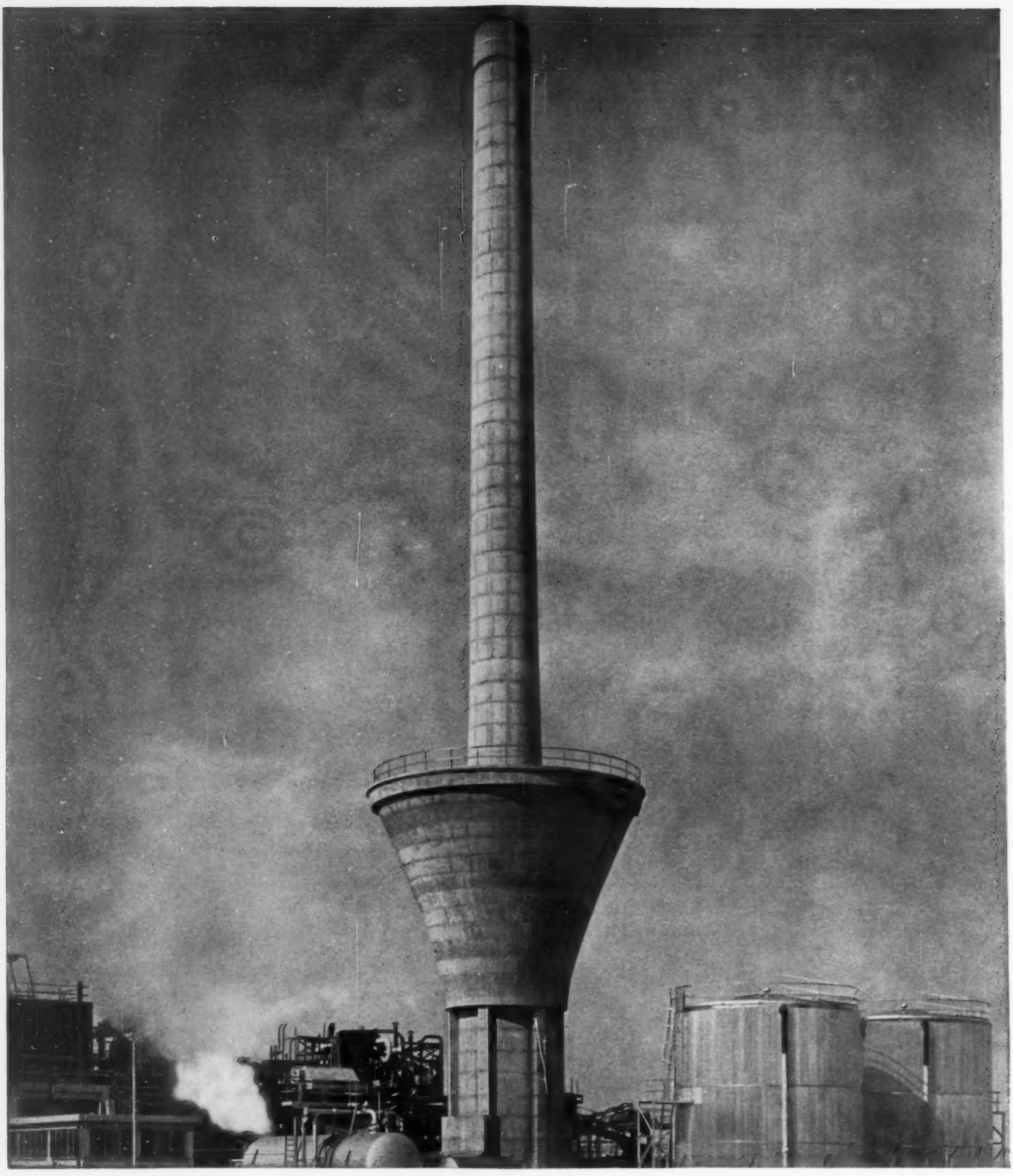

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McCULLOUGH FOUR-WAY SQUEEZE JET GUNS – designed to assure even distribution of cement around casing. **FRAC-JET** – fires eight jets on a horizontal plane for fracture placement.

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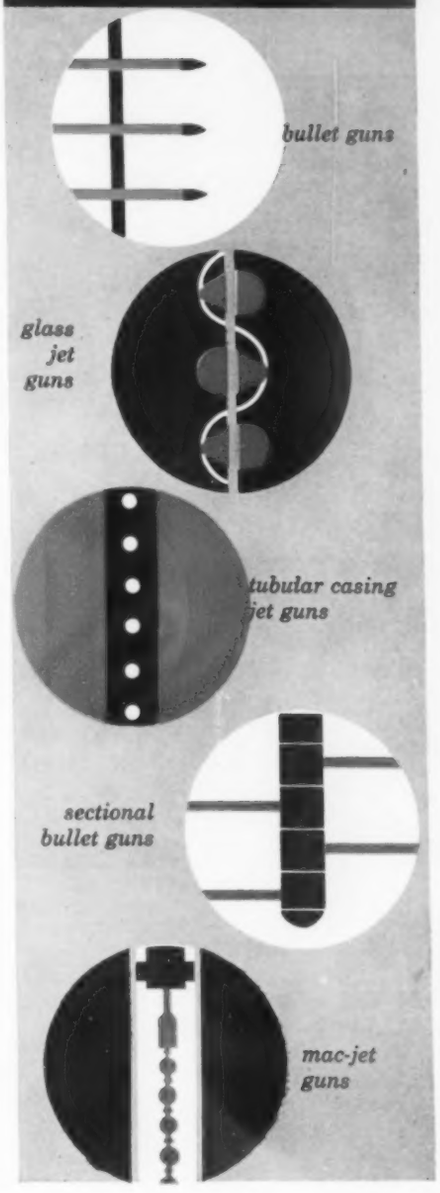

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Manufactured in rough or smooth bore in sizes up to 16" i.d. nominal and in lengths up to 50 feet.

Photograph by courtesy of the Chambre de Commerce de Marseille—Port of Lavera

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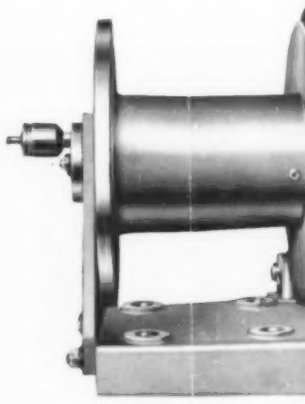

ROTAIR Portable Rotary-screw Air Compressors

Over-all efficiency and negligible maintenance costs are important features of ROTAIR compressors. There are no reciprocating parts: vibration is minimised. Positive clearances prevent metal-to-metal contact both between the rotors and the stator casing; which is subject to no wear whatever. ROTAIR models deliver 150, 370, and 600 cu. ft. min. F.A.D. at 100 p.s.i. Stationary models are also available.

Catalogue RO 2

HOLMAN also manufacture portable reciprocating compressors in which detailed attention to valve design, and the use of double-acting differential pistons, contribute to long life and efficiency. The range includes three water-cooled and two air-cooled models with capacities from 120 to 315 cu. ft. min. at 100 p.s.i.

General Catalogue, Section A 2

TRACTAIR and HOLPACK Portable Air Compressors

For on-the-spot manœuvrability, HOLMAN offer a choice of tractor-mounted air compressors. Tractair Models 8 and 13 comprise self-contained HOLMAN two-stage compressor units mounted on Fordson Major tractors and driven from the power take-off shaft. Holpack Air Compressor assemblies are suitable for attaching to tractors which have hydraulic or power-operated lift linkage. The Holpack can be lifted bodily and taken to the work site. If the tractor is required for other work it can be detached in less than two minutes. Tractair and Holpack Models 8 and 13 have outputs of 71·5 cu. ft. min. and 110 cu. ft. min. F.A.D. at 100 p.s.i. respectively.

Leaflets A 5, A 6, A 7, A 8 and A 9

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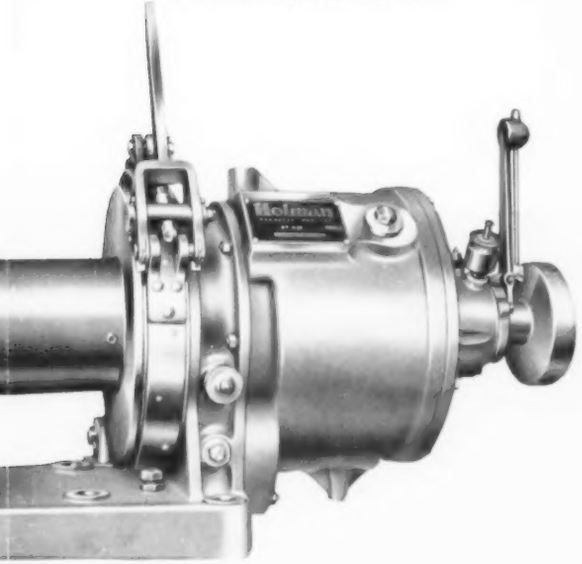
hes, etc.

HOLMAN Air Motors and Air Winches

Compact, robust, powerful and safe means of handling heavy loads of all kinds. HOLMAN Air Winches range in power from 5 to 15 h.p. The ROTOWINCH is powered by a reversible motor capable of a rope pull of 4,000 lb. at 120 ft. min. rope speed. HOLMAN Cable Winches have high torque at low speeds and rope pulls of from 1,260 lb. to 5,000 lb.

General Catalogue, Section B 1



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General Catalogue K 2, and Publications SP 17 and SP 30

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HOLMAN Submersible Pumps

Centrifugal, self-priming, submersible pumps for handling water, oil, sewage and even moderately heavy sludge. Single-stage models can cope with heads to 100 feet. For heads from 120 feet to 240 feet there are two double-stage models. All submersible pumps have specially designed vane-type air motors.

General Catalogue, Section K 11

HOLMAN Sludge Pump

This portable ejector pump is designed for working at low heads and for raising non-corrosive, very dirty, contaminated, or gritty water containing a high percentage of solids, against heads up to 50 feet. The action is entirely automatic and the pump is self-priming.

General Catalogue, Section K 11

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Centrifugal pumps with 3-phase squirrel-cage motors for continuous operation, are intended for pumping out foundation sites, flooded areas, and for coping with large quantities of water. GRINDEX Minor and Standard pumps are rated at 220 and 320 I.G./min. respectively at 30-feet head. These pumps can be coupled in series for increased lift, and they can operate dry without damage.

Publication: Grindex Hydromaster Leaflet

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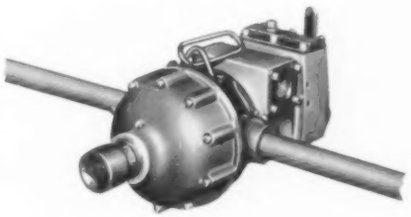
The HOLMAN concrete compactor — specially designed for use in road building — is available in various lengths.

General Catalogue, Sections S 1, and Leaflets STV 1, 2 and 3



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General Catalogue, Section K 12

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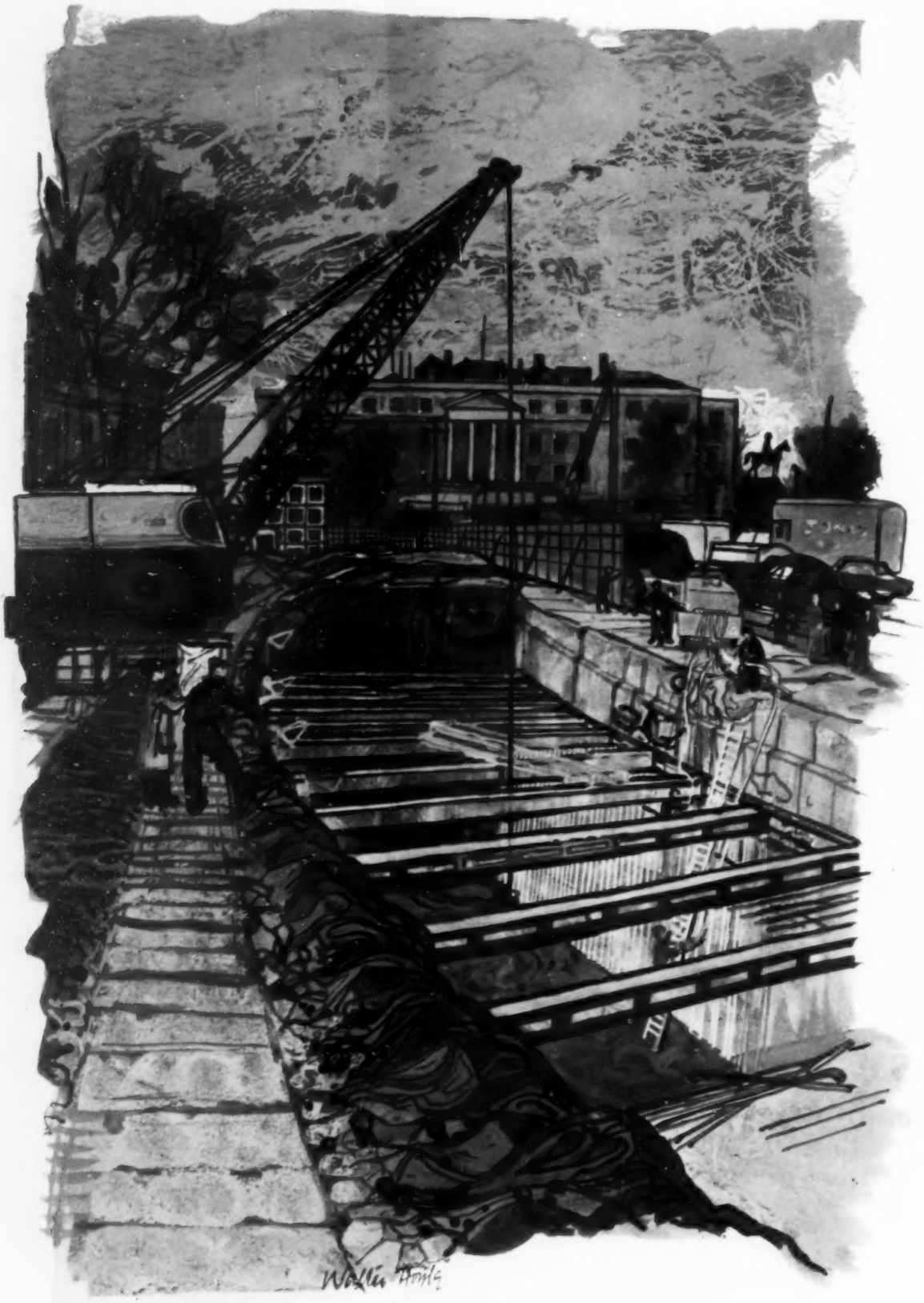

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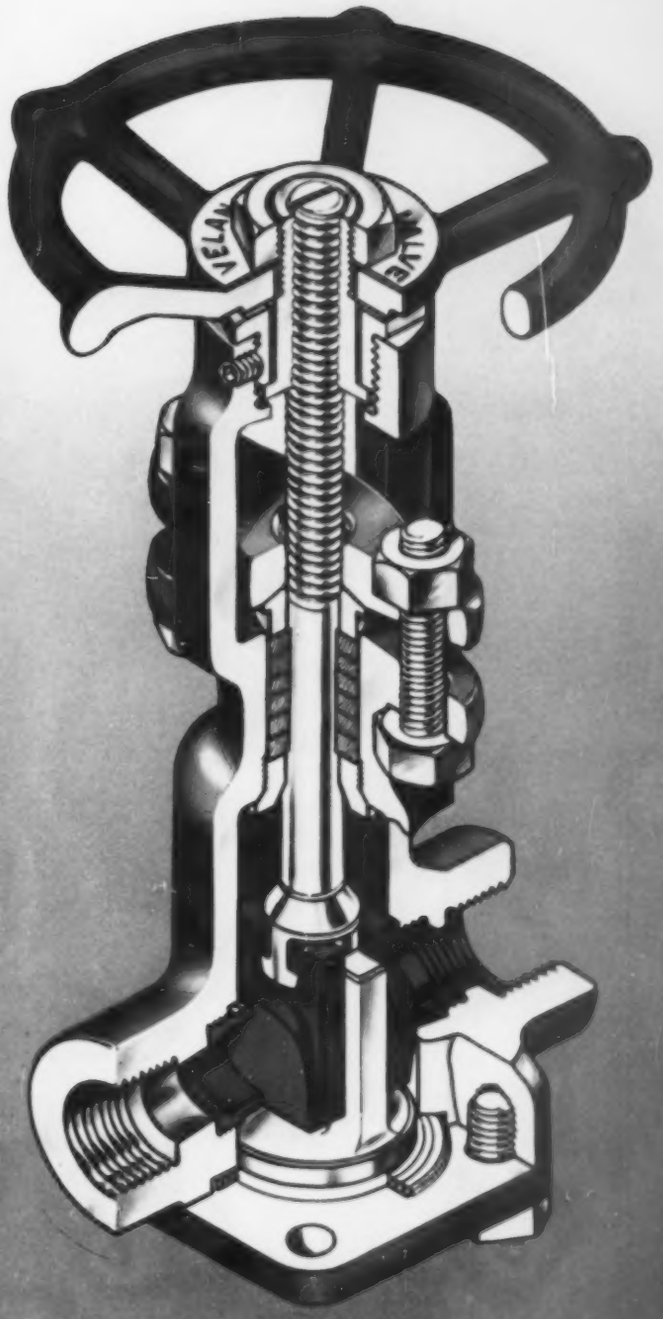

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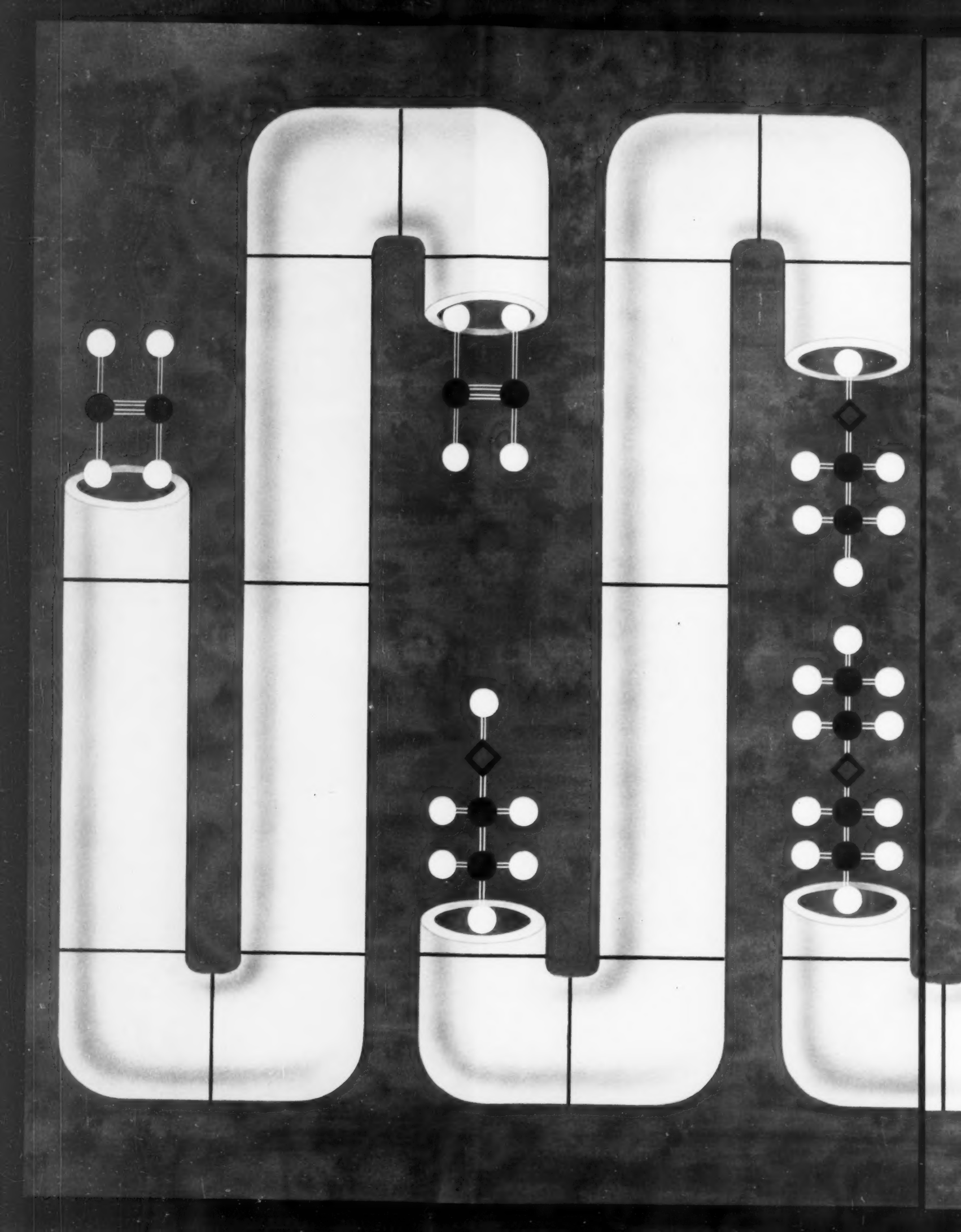

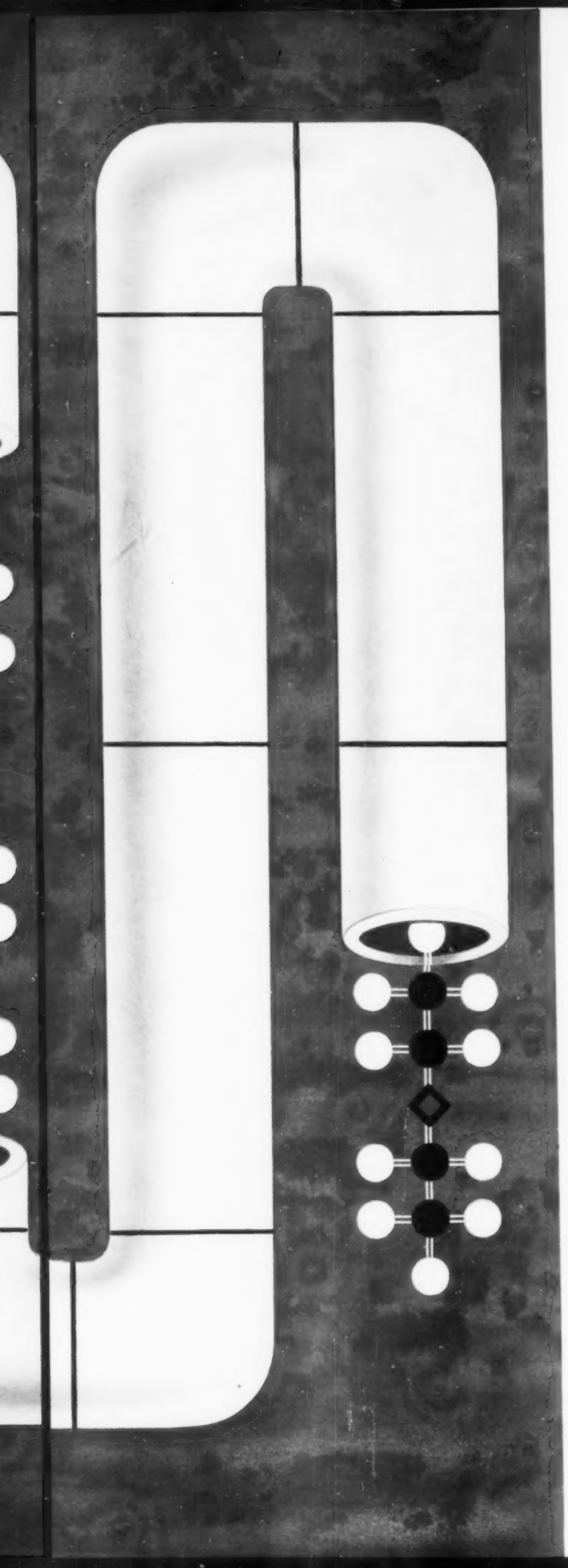

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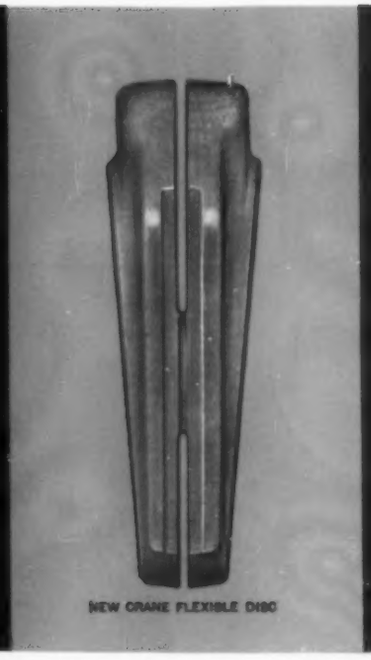

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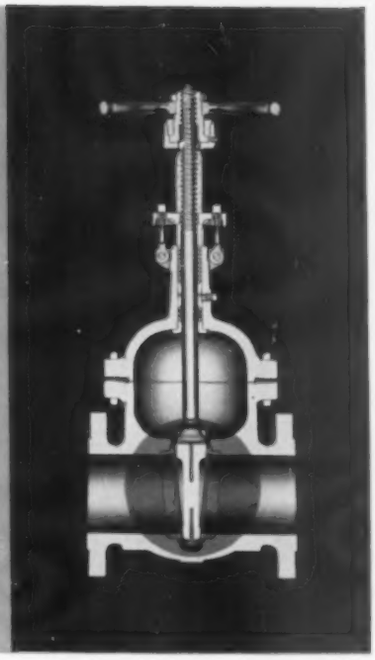

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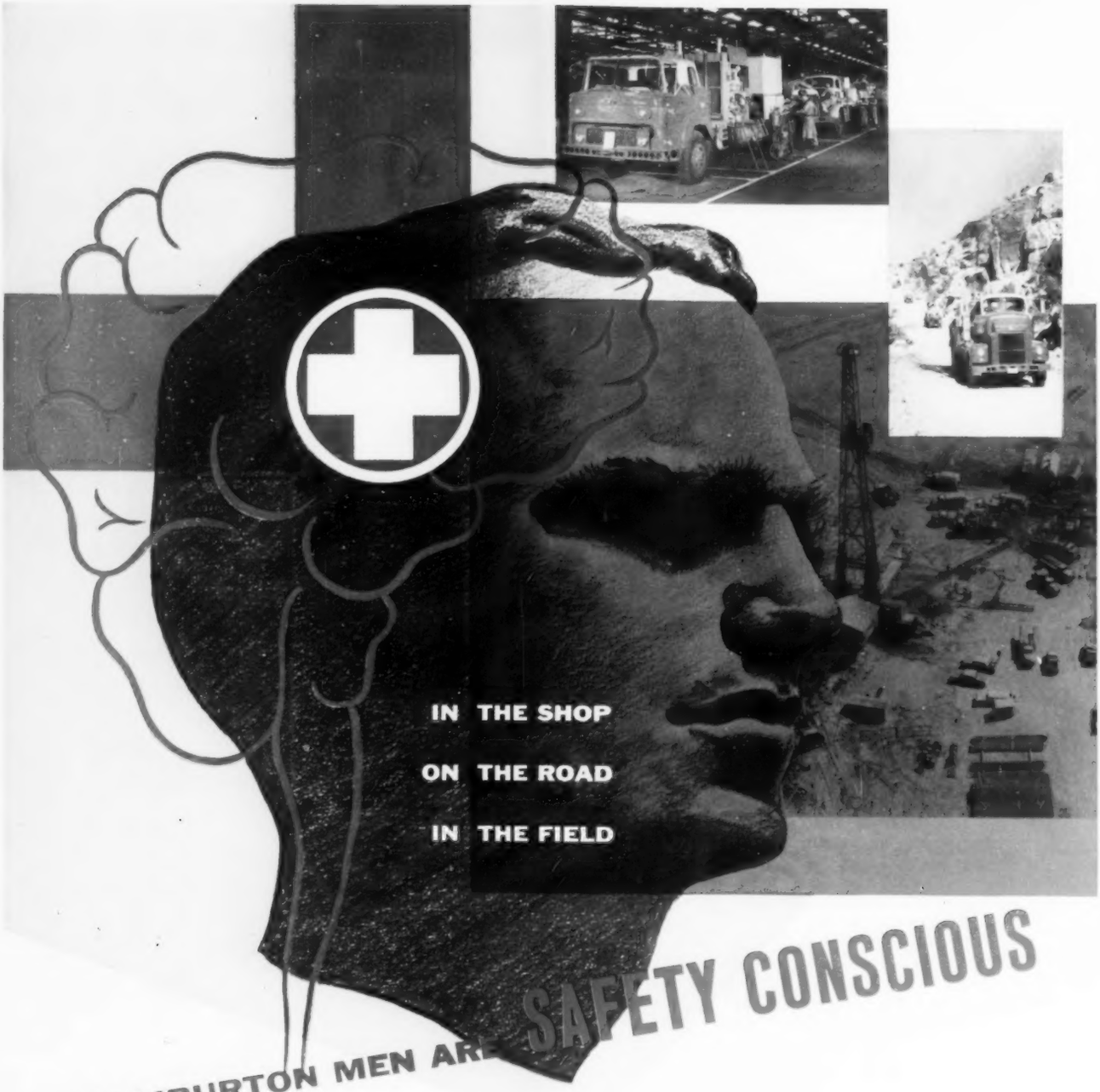

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Russian oil exports—what to do?

A June 1st broadcast by the Soviet radio denounced as a "fairy tale by U. S. and British imperialists" an article entitled "Soviet Oil Threatens the Middle East," published in WORLD PETROLEUM (February 1961, page 41). The author, Emil Bustani, is an Arab contractor in Lebanon. His thesis that Soviet oil exports were cutting into Middle East exports was attacked by the broadcast as "fantastic."

Facts indicate, however, that the threat may not be so fantastic after all. Soviet oil exports to the free world, including crude and products, have risen about thirteenfold since 1953. They were then about 35,000 b/d and now are over 450,000 b/d. They will rise also in the future. WORLD PETROLEUM now estimates 1,200,000 b/d for total Soviet exports of crude and products (including natural gasoline) in 1965, rising to 1,600,000 barrels daily by 1970, of which 800,000 b/d will go to the free world in 1965 and 1,000,000 b/d in 1970 (the remainder will go to Soviet satellites and Red China).

In the broadcast referred to, it was stated that during the past five years Soviet exports had increased by 15 million tons, but that during the same period exports by the Arab producing countries had increased by 100 million tons, and that "the need for liquid fuel throughout the world is increasing at such a pace that the appearance of Soviet oil on foreign markets does not harm any oil producer."

While it is true that as a share of entire world consumption the Soviet figures do not loom large (estimated world consumption in 1970 is 32 million barrels daily, and the expected Russian figure would only be 1/32 of that) as usual, figures do not tell the entire story. In a recent address Mr. Gordon Reed, chairman of Texas Gulf Producing Company, pointed out that in those countries now receiving Russian oil Russian imports were 8% of their 1960 demand. The percentage varies widely, of course, from 100% in Iceland to 87% in Finland, 34% in Egypt, down to 21% in the important Italian market, 23% of Greek demand and 16% of Austria's. The impact of this low priced crude oil, however, is more in its price than its quantity. In a competitive market even three or four percent of low-priced crude oil causes the price level to slide. As Mr. Reed also pointed out, the case of Germany illustrates the point. West Germany imported 57,000 b/d of Russian crude and products per day in 1960, about 9% of her total demand at a price 30% below that paid by the nearby satellite Czechoslovakia. That 9% of her demand completely ruined the profit margins of the West German refining and distributing complex. The German state lost the income taxes that would otherwise be payable on the $1.5 billion industry, and the West German steel industry benefits from the purchase of steel by the Russians in exchange for the oil.

Underlying the Russian oil drive lies the need for export earnings. There is no way Russia can buy the machines and manufactured goods she needs for industrialization except through sale of gold or export earnings. In 1960 Russia sold some $200,000,000 worth of gold to the West at $35 per ounce. She has enormous gold reserves but not enough to continue exporting indefinitely on such a scale; and at such a very low price for gold. Export earnings remain the only long-range hope for earnings in the large amounts needed.

The question then arises, what can be done about it? Of the possible avenues of approach, action by the oil companies seems the least likely to succeed. Pointing out the disadvantages to becoming too dependent on Soviet supplies to the producing countries involved would do little good. Any voice with an interest is suspect and the importing countries would not pay any attention. To meet the Russian threat with price cuts would injure the producing countries—already resentful of the last reductions in crude prices. The formation of OPEC was a direct result of that price cut. In any case, it would reduce company revenues to the point where future expansion and exploration would be severely impaired.

The alternative is action by the governments involved. A sort of "economic NATO" has been suggested by Mr. Reed, as an alliance of importing countries to impose quotas on Russian oil imports. This is obviously on the government level. It would involve the sacrifice of receiving immediate gain from low-priced Russian crude in order to avoid the risk of having it cut off in the future for political reasons or having the price boosted once alternative sources were cut off.

On the other hand, producing countries could do well to recognize that the importance of the Russian oil drive lies in its price aspects, not its volume. The reduction of prices means, in effect, that the industrialized "have" nations benefit at the expense of the Arab nations, a sort of "Robin Hood" in reverse. All the large producing countries have great need at this time of capital for development and can ill withstand reduction in their government's all-important oil revenues.

Perhaps Russia could be induced to join OPEC if enough coercion were applied. A similar situation has arisen before concerning other commodities. In the case of the diamond industry, Russia discovered them several years ago and started to put them on the international market. Very soon because of the resistance by dealers who were members of the deBeers syndicate, Russia soon came into line and now gets her share of the diamond market at the deBeers level. The same happned in the international tin market, where the Russian exports now enter in conformity with international arrangements.

It is on this point that the Russian oil drive, in fact the entire Russian exporting position is particularly vulnerable. The Russians are in the position of a competitor to the under-developed nations they seek as allies. These countries too are exporters of raw material, and Russian exports which tend to drive down the international price are harmful to their economies. It is time this was realized by the Arab countries before it is too late.

Arab farmer. Photo courtesy The Shell Magazine

A role for OPEC

by Francisco R. Parra
Arthur D. Little, Inc.

Maintenance of oil prices is not the only objective of OPEC. Formation of a common oil policy for its members, maintenance of diplomatic relations with consuming countries and education of government oil experts are other possible aims

THE RECENT CREATION of a permanent secretariat for OPEC (the Organization of Petroleum Exporting Countries whose present membership consists of Iran, Iraq, Kuwait, Saudi Arabia, Qatar and Venezuela) has given greater substance to the efforts at international cooperation between the governments of the major petroleum exporters. In the view of these governments, it is both the crystallization of what has taken place in the field since the First Arab Petroleum Congress was held in Cairo in April 1959, and a tool to attain their fundamental objective of ensuring that the interests of the oil companies operating in their countries do not override the national interests.

There has been no lack of voices to tell OPEC why it cannot, and even why it should not, work. In fact, in an age when international agencies are born every day, this one has had a particularly poor reception, even among public opinion in Venezuela, one of the founding members.

Most of the objections to OPEC have centered on the proposals for world prorationing that some of its members have been propounding. The serious weakening of crude sales realizations in 1959 and 1960 convinced these, rightly or wrongly, that the exporting countries must henceforth themselves take a direct hand in stabilizing prices and preventing further decreases. The debate on this subject has partially obscured the significance of OPEC in a wider field. OPEC is not an official body dedicated to the implementation of world prorationing. Some of its members favor it and some oppose it. A period of study and negotiation will now follow which will be an important part, although only a part, of OPEC's work.

What, essentially, will OPEC's role be? Perhaps the first thing to observe is that its constituent members know, in general terms, where they want to go. Those who assume that their main objective is a larger slice of the pie may be doing themselves a disservice, by refusing to recognize the prime motivation of virtually all of the member government's thinking during the past several years, which has been an increasing determination to take a direct hand in the affairs of the industry on which their very existence as modern states depends. What they lack is the means to get at this goal.

Appreciation of this aspect of the question is essential to any speculation over OPEC's future role and it suggests that this role is likely to be threefold.

In the first place, OPEC will probably devote part of its efforts to developing the tools necessary to the achievement of its members' objectives. The most obvious of these is the creation of a central source of information available to members, which would become extremely valuable for a number of reasons. In the past, this flow of information between the governments concerned has been sporadic, confined to top levels, and usually dealt with specific issues at hand. As a result, the governments have had to sit back and listen to what the oil companies told them, without having any solid basis for comparison or checking. They will now be able to obtain fuller information on concessions, taxes, investments, costs, profitability, sales contracts, prices, etc., than any single company. In other words, OPEC may thus eliminate one of the disadvantages in its member governments' dealings with the oil companies, which was their lack of data on operations in other countries. It will undoubtedly take time to digest the mass of information being put together, but when it is done, the governments may find the food for thought extremely profitable.

The flow of information will not be confined to data originating in the members' countries. The location of the Secretariat's offices in Geneva will mean that its staff, and therefore its members, will have the opportunity of becoming increasingly familiar with their markets, and especially with Western Europe, the largest and most complex of them all. There is nothing like being geographically in the middle of it, so to speak, for fruitful observation.

However, OPEC will probably realize that the most indispensable of tools is a body of professional people competent to fill the increasing requirements of the member governments. It is obviously no use trying to do something unless one knows how to go about it. In the past, the member governments have been hampered by a severe shortage of sufficiently trained personnel. If

Note: Documents relating to concessions and oil laws among the OPEC members have been published and are available from *Petroleum Legislation, P. O. Box 1591, Grand Central Station, New York 17, New York, USA.*

Arab camel market in Libya
Caltex photo.

they are to avoid making serious errors, they need more than a handful of talented men; they also need a large pool of experienced specialists. OPEC will undoubtedly address itself to this problem, partly by facilitating the interchange of government officials between the member countries and partly by itself providing a training ground. It is not inconceivable that more ambitious steps follow. There is no reason why OPEC should not establish a petroleum school at University and pre-University level, attached perhaps to some other University and supported by scholarships. It could thus be oriented specifically to the industry in OPEC countries. None of the countries really has the resources to mount such an educational effort by itself. Between them, the industry is of such a magnitude and of such long-term importance that so specialized a University might be justified. Not only would it produce a sufficient flow of technically qualified men but, through the special community of interest of its students, it might sow the seeds for a remarkable crop of international co-operation.

OPEC will of course examine the feasibility of establishing a joint Irano-Arab-Venezuelan operating company as a potentially powerful tool in achieving their aims. It may even become an end in itself, but initially it will be viewed as a means of acquiring experience, knowledge, and a foothold in the industry beyond the members' national borders. Whether it takes the shape of a fully integrated company or not may be immaterial at first: the principal danger is that it would become a serious financial drain because of over-ambitious projects. Nearly all the OPEC countries now have national oil companies (most of them in the embryonic stage) with prospects of substantial crude production. Sooner or later, international markets will have to be developed and it would certainly be absurd for the OPEC countries, that have ostensibly come together to cooperate, to each enter market separately and thus inject an additional element of competition into a situation which, if it cannot yet be described as cutthroat, has certainly deteriorated to the point where the knives are out. Moreover, much has been made of the fact that Soviet oil has had a certain competitive advantage in the international markets because it is backed by the State, an observation that will not be lost on OPEC. In particular, some consuming countries have been able to do business with the Russians not simply because of lower prices but because the barter of goods was involved, a method not easily adaptable to the operations of private companies. OPEC itself is not a suitable vehicle for an operating company, but the impetus for such a company, if it comes, will doubtless come from this corner.

A second portion of OPEC's efforts will probably be devoted to the conduct of diplomatic relations with other parties. This will form an important segment of OPEC's over-all role. There are too many people with a legitimate interest in the proper functioning of the international oil industry for OPEC to be allowed to work in a vacuum, without any regard for these interests. The Organization will therefore be called upon to perform a delicate diplomatic operation through the establishment of continuous and semi-official relations with the representatives of these interests, the most important of which are the principal consuming countries. The relations will not of course replace contact through normal diplomatic channels, but the specialized nature of OPEC, its official status and its geographical location will inevitably make it a voice to be listened to by other governments.

The delicacy of the operation will reside largely in the need to gain acceptance on the part of some of the principal consuming countries, particularly in Western Europe, where the OPEC countries are regarded with the suspicion usually reserved for hot-headed nationalism. Acceptance is necessary to OPEC because it will not wish to see the formation of a hostile, consumer-country agency, devoted to direct opposition. Probably, too, a higher price will be required of OPEC to avoid this eventuality than the utterance of suitably respectable noises (known in some quarters as public relations); OPEC may have to make some more definite commitment not to take any unilateral action strongly prejudicial to the consuming countries' economies. It will

Staircase design on oil installation

therefore try to steer its way carefully between the twin dangers of provoking a crystallization of consumer-country opposition, and of allowing itself to be drawn too easily into negotiation of matters which it would prefer to handle alone. The difficulty of this is heightened by the necessity of the OPEC countries to leave the concessionnaires constantly in the shadow of unilateral governmental action. They reason that the obligations and rights spelled out in detail in concession agreements are of an unusually long-term nature, and the companies will not accede to revisions unless they otherwise stand to lose something.

The consuming countries are not the only ones with which OPEC will have to tangle in a diplomatic sense. The owner countries, essentially the U.S. and the U.K., will watch developments with anxious eyes since they naturally both regard access to the energy reserves of the OPEC countries as important to their long-term security. In this area, OPEC will probably orient its efforts to stressing those aspects of the industry where the governments' interests coincide with the companies'. In particular, OPEC will have to prepare the way for acceptance by the U.S. and British governments of future modifications in the company government relationship.

OPEC may also be called upon to handle, in an unofficial way, some relations with the parent companies of the producing subsidiaries, and the Organization must be careful not to adopt too antagonistic an attitude. It must not fall into the error of regarding the companies as its natural enemies, but should look positively at the area where there is a real community of interest. OPEC may have a substantial contribution to make in this field, especially with respect to preventing a rapid deterioration in relations between governments and companies, of which there is some danger at present. OPEC will have the advantage of being able to conduct talks on a more informal and relaxed basis than is possible between the producing subsidiaries and the government. Conversations between producing subsidiaries and government tend to be too tense and guarded out of fear of possible repercussions from what is said. Moreover the governments are usually inhibited by the prevailing attitude of the public in their respective countries from appearing to get along too easily with the companies. Perhaps OPEC can provide a useful counterweight to this.

Finally, in the way of diplomatic effort, OPEC may attempt to gain some acceptance in the minds of that part of the public that follows petroleum affairs with interest. This is more akin to public relations, but at a rather sophisticated level. The main thing here would be to make sure that OPEC is not represented as an extremist and irresponsible influence.

The third area where OPEC may be expected to play a role is in the establishment and consolidation of a common policy for its members. This may be the most important of its functions, and of course one of the first matters on which it will no doubt try to get agreement is world prorationing and price stabilization. Several other matters on OPEC's agenda have been implied, such as the alleged high oil company profits, the uniformity of concession agreements, conservation practices, etc. and any common policy adopted on these questions will have an almost immediate effect on company operations. It is after all as a cooperative venture for the incubation of common politics that OPEC was first formed, at the urging of Saudi Arabia's Sheikh Abdullah Tariki and Venezuela's Dr. Perez Alfonzo, and at least a major part of its efforts is likely to be concentrated in this field, particularly with regard to prices. Enough has already been said by others on this subject, and certainly examination of the merits of any particular policy is beyond the scope of this article. All that has been said above is merely to indicate the areas where OPEC may be expected to play a role. And those who are skeptical about the possible effectiveness of this role might do well to ask themselves how much lower posted crude oil prices would be today without OPEC. The main point of this is to recognize OPEC for what it could potentially be and not to make the mistake of regarding it in the narrow context of a price-fixing organization, even though this may be the issue that will occupy its attention most fully during the initial stages. END

Free world geophysical activity—1960

PETROLEUM GEOPHYSICAL EXPLORATION in the free world declined 8.3% to 10,526 crew months in 1960 for a net loss of 955 crew months. Airborne magnetometer activity rose 68%, however, with 556,752 line miles being reported. The year 1960 was the fourth consecutive year in which free world geophysical activity has declined, and activity in this year was reduced to a level 22.8% below the peak year of 1956.

Total free world geophysical activity in 1960 represented an average of 877 geophysical crews consisting of 743 seismic crews, 114 gravity crews, 14 ground magnetic crews and 6 crews utilizing other ground geophysical methods.

Recent information on 1960 geophysical activity in The Soviet Bloc countries indicates only that the level of geophysical activity continued to expand. The published statement of a prominent Russian scientist in May 1960 indicated that there were 400 seismic crews prospecting for oil and gas in The Soviet Union and that the number would be increased to 1,200 by 1965.

Trends by Areas: With the notable exception of Africa, total geophysical activity was down in all major geographical areas of the Free World in 1960. Total activity in the Western Hemisphere declined 11.8% whereas activity in the Eastern Hemisphere almost held level showing a decline of only 0.4%. The greatest percentage declines were registered in Central America-West Indies where activity fell 50.9% and in the Middle East which was off 32.1%. Percentage losses in other areas were as follows: South America, —21.9%; Canada, —18.4%; Europe, —8.7%; the United States, —8.6%; and the Far East, —5.5%. Table 1 gives a breakdown of 1960 geophysical activity by types and selected areas of the Free World along with comparable data for 1959 and percentage changes from 1959 levels.

The USA continued to be the most active petroleum geophysical exploration area of the free world in 1960 and its portion of total activity remained essentially the same at 49.5%. Africa moved ahead of Europe and South America in 1960 to become the second most active area increasing its share of total activity from 10.0% to 13.7%. All other major geographical areas of the free world declined as a percentage of total activity except Mexico and the Far East whose share increased very slightly. The Eastern Hemisphere continued to increase its share of total activity at the expense of the Western Hemisphere, raising its portion from 30.2% to 32.8%. The Western Hemisphere portion declined from 69.8% to 67.2%.

Seismic Activity: Total free world petroleum seismic exploration declined 8.3% in 1960 continuing the steady down trend which began in 1958. Seismic activity declined in all major areas except Africa which increased sharply and the Far East which was slightly upward. As indicated in Table 1, seismic activity in the Western Hemisphere declined 11.4% whereas activity in the Eastern Hemisphere was off only 0.4%.

Following the pattern of total geophysical activity, most of the major areas declined as a percentage of total seismic activity. The exceptions were Africa which increased its share from 10.5% to 13.5% and the Far East which increased slightly to 3.9%. The USA held its lead among the various areas of the free world, accounting for 51.9% of total seismic activity. Africa was the second most active area in seismic prospecting with 13.5% of total activity, followed by Europe with 10.3% and South America with 7.6%. Canada was close behind South America with 7.5%. The remaining major areas each had less than 4% of total world seismic activity. The Eastern Hemisphere portion of total seismic activity increased from 28.1% to 30.6% with a resultant decline in the Western Hemisphere's share from 71.9% to 69.4%.

Gravimeter Activity: Free world petroleum gravimeter exploration declined 7.9% in 1960, but movements were mixed as activity in the Eastern Hemisphere increased by 9.1%, while Western Hemisphere activity fell off 17%. Gains in Europe and Africa were responsible for the rise in Eastern Hemisphere activity. With the exception of activity in Mexico, which held constant, activity in all major areas of the Western Hemisphere declined. The decline in 1960 world gravimeter activity was a continuance of the downward trend which began in 1957.

Similar to distribution trends in seismic activity, the Western Hemisphere portion of total gravity activity was on the downgrade, falling from 65.3% in 1959 to 58.9% in 1960. Consequently, the Eastern Hemisphere portion rose to 41.1% in 1960. The USA held its first place position in total world gravimetric exploration, increasing its share of activity moderately to 38.5%. Africa moved up to the second most active position with 16% of total activity and South America was in the third position with 14.6%. The Far East was the fourth most active area with 11.9% of total activity followed by Europe with 8.6%. Each of the remaining major areas accounted for less than 5% of total activity and all declined in 1960 as a percentage of total world gravity activity.

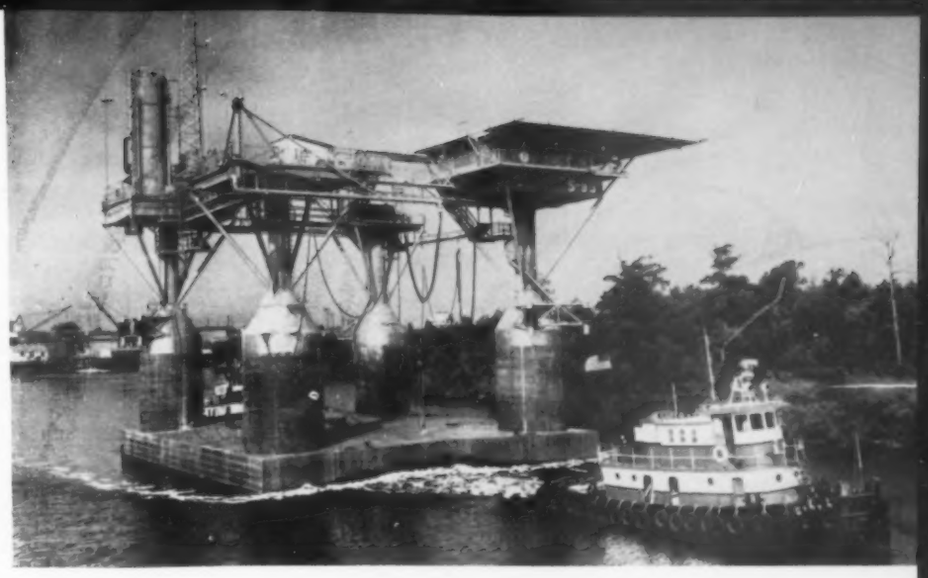
Ground Magnetometer Activity: In contrast to 1960 seismic and gravity trends, free world ground magnetometer exploration increased in 1960. The rise over 1959 was moderate, however, amounting to 3.1%. The increase was due to gains in the USA, South America and Europe. Western Hemisphere magnetometer activity was up 50%, but Eastern Hemisphere exploration fell off 19.3%. The Western Hemisphere portion of total magnetic activity rose to 47% with a resultant decline in the Eastern Hemisphere portion to 53%.

Airborne Magnetometer Activity: Similar to the trend in ground magnetometer activity, free world airborne magnetometer activity moved upward in 1960. Reports received indicate that 556,752 line miles were flown for an increase of 68% over 1959. With the exceptions of Canada and South America, airborne magnetometer activity increased in all major areas of the free world. The largest number of miles were flown in the USA, where 179,060 miles were reported for 32.2% of total activity. Africa followed close behind with 151,100 miles or 27.1% of total activity. END

The preceding article is based on a summary by Richard Rainey, Geophysical Service, Inc., Dallas, Texas, the report of the Committee on Geophysical Activity of the Society of Exploration Geophysicists. Mr. Rainey is chairman.

TABLE 1—GEOPHYSICAL EXPLORATION FOR PETROLEUM IN THE FREE WORLD—1960
(Crew Months)

	U.S.A.			CANADA			WESTERN HEMISPHERE			EASTERN HEMISPHERE			FREE WORLD		
	1959	1960	Percent Change	1959	1960	Percent Change	1959	1960	Percent Change	1959	1960	Percent Change	1959	1960	Percent Change
Seismic	5,097	4,625	— 9.3	796	667	— 16.2	6,988	6,188	— 11.4	2,735	2,725	— 0.4	9,723	8,913	— 8.3
Gravity	548	528	— 3.6	41	19	— 53.7	972	807	— 17.0	517	564	+ 9.1	1,489	1,371	— 7.9
Magnetic	51	54	+ 5.9	1	0	—100	52	78	+ 50.0	109	88	— 19.3	161	166	+ 3.1
Other	—	—	—	3	—	—100	3	—	—100	105	76	— 27.6	108	76	— 29.6
Totals	5,696	5,207	— 8.6	841	686	— 18.4	8,015	7,073	— 11.8	3,466	3,453	— 0.4	11,481	10,526	— 8.3



Offshore production is stored by Standard of California in this special rig which carries full producing facilities topside and stores upward of 20,000 barrels of oil in its underwater structure. The thick lower portions of supporting columns as well as the bottom mat hold oil

World-wide drilling remains high, and is trending upward. More contractors are entering the international field.

International rig report hits peak

AROUND the world drilling maintains a high pace. Contractors that were strictly domestic a few years ago have branched out to operate in countries most of their employees had never heard of before. Oil companies have continued to concentrate in the areas of oil production but more exploratory rigs are visible in virgin locations now then at any time.

The North African area continues to attract new companies and drillers. Libya is especially important, with specially-designed rigs for that area enabling quick rig moves with a minimum of labor across the flat desert. Algeria, too, is a center of activity, and air conditioning has eliminated the slump that usually takes place when the thermometer goes up to the 120° area. Egypt and Morocco have continued a steady pace but the new concessions in Egypt may boost activity there as well. Morocco has little activity as yet, with ENI searching but still without success.

Argentina and Bolivia now look like areas of most promise in South America. Australia seems likely to blossom out one day if oil is found, and the Far East will be the better off for it when and if it occurs.

There follows a summary of activity, area by area. For more details please refer to the accompanying tables on rigs and contractors operating.

Asia and Australasia: The most active country in the Far East continues to be

NOTE: Tables are dated 1 June 1961. Their source is International Rig Report, a monthly service reviewing contractors and company drilling around the world. Inquiries should be addressed to IRR, P. O. Box 3513, Grand Central Station, New York 17, New York.

WORLD-WIDE SUMMARY OF ROTARY RIGS DRILLING*

Country	Rigs	Country	Rigs	Country	Rigs
Alaska	11	Neutral Zone (offshore)	2	India	14
Canada	144	Qatar	2	Indonesia	11
United States	1,813	Saudi Arabia	3	Japan	16
NORTH AMERICA	1,968	Syria	1	New Zealand	1
		Turkey	14	Pakistan	5
Argentina	99	Trucial Coast	1	Philippines	2
Bolivia	18	MIDDLE EAST	52	ASIA & AUSTRALASIA	66
Brazil	46				
British Honduras	1	Algeria (OCRS)	43	Austria	16
Chile	5	Angola	3	France	31
Colombia	19	Egypt (est.)	8	Germany, West (est.)	70
Cuba (est.)	6	Gabon	2	Greece	2
Ecuador	3	Gambia	1	Italy (incl. Sicily)	44
Guatemala	1	Kenya	1	Netherlands	3
Mexico	114	Libya	28	Spain (est.)	12
Panama	1	Morocco	4	Switzerland	1
Peru	12	Madagascar	1	Yugoslavia (est.)	22
Trinidad	22	Nigeria	5	EUROPE	201
Venezuela	33	Portuguese Guinea	1		
SO. AMER. & CARIB.	380	Senegal	2	Albania (est.)	8
		Somalia	1	Czechoslovakia (est.)	50
Abu Dhabi	1	Spanish Sahara	1	Germany, East (est.)	6
Bahrain	1	AFRICA	101	Hungary	40
Iran	15			Poland (est.)	20
Iraq	0	Australia	5	Romania (est.)	100
Israel	5	British Borneo (est.)	2	Russia (est.)	1,000
Kuwait	3	Burma	4	COMMUNIST BLOC (est.)	1,224
Neutral Zone (onshore)	2	Formosa (Taiwan)	6	WORLD TOTAL	3,992

*This summary includes only rotary rigs working on exploratory and development locations. Cable tool rigs and rigs on workovers are not included. All Communist Bloc figures are estimates, and they include all types of rigs, both active or stacked.

ROTARY RIGS DRILLING FOR PETROLEUM

ASIA AND AUSTRALASIA*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
AUSTRALIA	Assoc. Aust. Oilfields	Unknown	1
	Union Aust. Oil & Gas	Oil Drlg. & Expl.	1
	Australasian Pet. Co. Pty.	Company rig	0
	Delhi/Santos	Company rig	1
	W. L. Sides & Son Pty. Ltd.	Company rig	0
	J. Strevens Syndicate	Company rig	0
	South Australian Mines Dept.	Unknown	0
	Woodside (Lakes Entrance) Oil	Oil Drlg. & Expl., Ltd.	0
	Frome-Broken Hill Pty.	Oil Drlg. & Expl., Ltd.	1
	Oil Development Company	Unknown	0
	Australian Oilfields	Unknown	1
BRITISH BORNEO	Shell Affiliates	Company rigs	2 (est.)
BURMA	Burma Oil Co. (1954), Ltd.	Santa Fe Drilling Co.	0
	Burma Oil Co. (1954), Ltd.	Company rigs	4

(Continued on following page)

Indonesia. There the companies have gone on drilling despite uncertainty that makes the government appear more desirous of getting private enterprise out than in. Australia is having a boom, even if it is of small proportions. The discovery at Cabawin by Union Oil has stimulated activity, and the government's subsidies to oil companies encourage activity still more. There seems little doubt that Australia, given reasonable success, will soon be a major area of activity, exceeding any other in the Far East.

Burma may soon see activity too, when the new Petroleum Code is passed. At present only Burma Oil is active. Other companies are interested, however.

Elsewhere in the Far East, oil interest is on the increase but still not large. India has granted new concessions to Burmah Oil and more exploration will undoubtedly begin there soon. Japan continues to search, but her ultimate prospects for large-scale oil are not good. Pakistan and New Zealand continue their search, Pakistan with the forthcoming aid of Soviet drillers who have just signed an exploration pact. In the Philippines a discovery was made earlier this year by a local company, and interest is expected to pick up shortly.

Middle East: Iran is the most active of the Middle Eastern countries, with 15 rigs running. Many of them are offshore rigs, with IPAC (the Pan American—NIOC affiliate) running two and SIRIP, the Italian government's company with NIOC's partnership, running another. NIOC itself has four rigs running. The Consortium (Iranian Oil Exploring and Producing Co.) has several rigs exploring its area and has made several important finds recently.

Attention has concentrated on the Trucial Coast recently, where two rigs are running at Murban and one is drilling offshore on the Abu Dhabi area. The British Petroleum/Cie. Francaise rig offshore is working on a structure which is rumored to be extremely productive with high reserve potential, but the company is not releasing any information regarding results there. The Murban well is still a question mark, and has been for many years, but it is now looking up with a recent discovery well and another drilling close to it.

Elsewhere in the Middle East activity is slower. Iraq has no rigs running, since the government shut them all down in a dispute over concession terms with the company. Israel has some activity, but it too is slower than before. The Neutral Zone has good activity underway both onshore and offshore. Aminoil/Getty have been drilling exploratory wells recently but so far without discovery. The Japanese are entering the production stage on their offshore field.

Qatar has two rigs drilling, with no discoveries reported. Syria has only one exploratory rig running now. Turkey is in the beginnings of a drilling pickup since Mobil found oil near the new refinery site and not far from the ocean. Most active drilling company is the government's TPAO, with

ASIA AND AUSTRALASIA* (Continued)

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
INDIA	Oil India, Ltd.	Company rigs	4
	Oil & Gas Commission	Russian Contractors	5
	Oil & Gas Commission	Romanian Contractors	3
	Oil & Gas Commission[1]	Unknown	2
INDONESIA	Caltex	Company rigs (Cardwell 36-L)	2
	Shell	Company rigs	3
	Standard Vacuum Oil Co.	Company rigs	2
	Permina (Govt.)	Company rigs	4 (est.)
JAPAN	Japan Pet. Explor. Co.	Company rigs	13
	Japan Pet. Explor. Co.	Teiseki Tomi Drlg. Co. Ltd.	2
	Japan Pet. Explor. Co.	Amaze Oil Co. Ltd.	1
NEW ZEALAND	Shell-Brit. Pet./Todd Bros.	Company rig	1
	Brit. Pet./Shell/Todd Bros.	Company rig	0
PAKISTAN	Pakistan Petroleum Ltd.	Santa Fe Drilling Co.	1
	Pakistan Petroleum Ltd.	Company rig	1
	Attock Oil Co.	Company rig	1
	Pakistan Oil Fields, Ltd.	Company rig	1
	Pakistan Shell Oil Co. Ltd.	Company rig	1
PHILIPPINES	Standard Vacuum Oil Co.	Santa Fe Drilling Co.	1
	Acoje Oil Co.	Company rig	0
	Redeco	Company rig	0
	Philippine Oil Dev. Co.	Company rig	1
TAIWAN (FORMOSA)[2]	Chinese Petroleum Corp.	Company rigs	6
TIMOR	Tradewinds Exploration Co.	Company rig	0

*This breakdown includes only rotary rigs working on exploratory and development locations. Cable tool rigs and rigs on workovers are not included.
[1] 4 structure rigs running in addition to total shown, plus 18 shothole.
[2] 2 rigs additional stacked.

MIDDLE EAST*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
ABU DHABI	Abu Dhabi Marine Areas Ltd.	Company rig (Brit. Pet.)	1
BAHRAIN	Bahrain Petroleum Co., Ltd.	Company rig (T-20, Nat. 100)	1
IRAN	NIOC (Nat. Iranian Oil Co.)	Company rigs	2
	NIOC (Nat. Iranian Oil Co.)	Sedco	2
	IOEPC (Iranian Oil Expl. & Prod.)	Seacat Marine Drlg. Co.	1
	IOEPC (Iranian Oil Expl. & Prod.)	International Drlg. Co.	3
	IOEPC (Iranian Oil Expl. & Prod.)	Santa Fe Drilling Co.	3
	IPAC (NIOC & Pan American)	Seacat Marine Drlg. Co.	2
	SIRIP (NIOC & Agip Mineraria)	Company rigs	2
IRAQ	Iraq Petroleum Co.	Company rig	0
	Iraq Petroleum Co.	Drilexco	0
	Basrah Petroleum Co.	Company rig	0
	Basrah Petroleum Co.	Kier Cawder Arrow Drlg.	0
	Mosul Petroleum Co.	Company rig	0
ISRAEL	Naptha Israel Pet. Corp.	Oil Well Drillers, Ltd.	2
	Lapidot Israel Oil Prospectors	Company rigs	3
KUWAIT	Kuwait Oil Co.	International Drilling Co.	3
LEBANON	Cie. Libanaise des Petroles	Deutsche Schachtbau & Tie.	0
NEUTRAL ZONE	Arabian Oil Co. (offshore)	International Drlg. Co.	1
	Arabian Oil Co. (offshore)	Seacat Drilling Co.	1
	American Independent Oil Co.	Santa Fe Drilling Co.	2
QATAR	Shell Co. of Qatar, Ltd.	Company rig	1
	Qatar Petroleum Co. Ltd.	Company rig	1
SAUDI ARABIA	Arabian American Oil Co.	Company rigs	3
SYRIA	Concordia (Deutsche Erdoel)	Company rig	1
TRUCIAL COAST	Pet. Dev. (Trucial Coast)	Company rig	1
TURKEY	Turkish Pet. Corp. (TPAO)	Company rigs	7
	T. Shell	Keir & Cawder Arrow Drlg.	1
	T. Gulf	Pergeo (Italian Co.)	1
	C. Deilmann-Bergbau G.m.b.H.	Company rig	1
	Mining Research (MTA)	Company rig	1
	Mobil Exploration	Camdrill Labor Cont. (Oilwell 96 Skid)	1
	Mobil Exploration	Camdrill Labor Cont. (Nat. T-32)	1
	American Overseas	Deilman (Cardwell Hoist)	1

*This breakdown includes only rotary rigs working on exploratory and development locations. Cable tool rigs and rigs on workovers are not included.

AFRICA*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
ALGERIA (OCRS)	PREPA/Cities Service/FRANCAREP	Forafrance	1
	CFPA (Cie. Fr. des Pet. Alg.)	Forenco	0
	CFPA	Sogefor	0
	CFPA	Company rigs	2
	CEP (Cie. d'Exploration Pet.)	Ste. Languedocienne	2
	CEP	Forex	1
	CEP	Forenco	2
	Phillips/COFEPA/Omnirex	Forex	0
	Sinclair/AFROPEC/COFEPA	Ste. Languedocienne	0
	S.N. REPAL	Travaux Souterrains	2
	S.N. REPAL	Ste. Languedocienne	1

	S.N. REPAL	Company rigs	6
	S.N. REPAL	REPAL	1
	CREPS	Company rigs	3
	CREPS	Siforep	1
	CREPS	Forex	2
	CREPS	Forenco	1
	CREPS	Travaux Souterrains	1
	PETROPAR—AMIF	Ste. Languedocienne	0
	Ste. Nat. des Pet. d'Aquitaine	Forex	1
	Cie. Franc. des Petroles (CFP)	Camay Drilling Co.-Citra	0
	CPA (Cie. Petroles Algerie)	Ste. Languedocienne	1
	EURAFREP/Elwerath/Petropar	Forex	1
	Ste. Saharienne de Rech. Pet.	Company rig	1
	Frandel/Petropar/Francarep	Travaux Souterrains	0
	Wintersh./Francarep/PETROPAR	Forafrance	0
	AFROPEC/PREPA/Francarep	Comafor	1
	COPAREX	Forenco	0
	SAFREP	Company rig	0
	COPEFA	Ste. Languedocienne	1
	Unknown	Unknown	11
ANGOLA	Petrofina	Company rigs (Ideco Super 7-11, Ideco H-40, Ideal 110, Ideal 130)	3
EGYPT	General Petroleum Co.	Company rigs	2 (est.)
	Eastern Petroleum Co.	Company rigs	6 (est.)
GABON	SPAFE (Ste. des Pet. d'Afr. Eqt.)	Forex (Ideco H-40)	1
	SPAFE/Mobil	Company rigs (Ideco H-40)	1
GAMBIA	British Petroleum/B.R.P.	Forex	1
KENYA	British Petroleum Co.	Forasol (Strat. rig)	1
LIBYA	Oasis Oil Co. of Libya	International Drlg. Co.	4
	Oasis Oil Co. of Libya	Camdrill	1
	Oasis Oil Co. of Libya	Company rig	0
	Oasis Oil Co. of Libya	Loffland Bros. Co.	1
	Esso Standard (Libya), Inc.	International Drlg. Co.	1
	Esso Standard (Libya), Inc.	Loffland Bros. Co.	1
	Esso Standard (Libya), Inc.	Camdrill	1
	Esso Standard (Sirte), Inc.	Loffland Bros. Co.	1
	Esso Standard (Sirte), Inc.	Camdrill	1
	American Overseas Pet. Co.	Santa Fe Drilling Co.	2
	Mobil Oil of Canada	Loffland Bros. Co. (Nat. 125 Skid)	1
	Mobil Oil of Canada	Santa Fe Labor Cont. (Unit Rig 36A)	1
	Mobil Oil of Canada	Camdrill (Unit Rig U-36A Trailer)	1
	British Pet. Co. (D'Arcy Exp)	Forenco	1
	British Pet. Co. (D'Arcy Exp)	Forasol	2
	CPTL (Cie. des Pet. Total)	Forex	1
	Gulf Oil of Libya	Santa Fe Drilling Co.	0
	Gulf Oil of Libya	Camdrill	1
	Nelson Bunker Hunt/BP expl.	Unknown	2
	Anglo-Saxon Petrol. Co. Ltd.	Unknown	0
	DEA (Deutsche Erdoel Aktg.)	Forenco	1
	Pan American	International Drlg. Co.	2
	Elwerath	Company rig	1
	CORI	Company rig	1
MADAGASCAR	Ste. des Pet. de Madagascar	Ste. Languedocienne	1
MIDDLE CONGO	SPAFE (Ste. des Pet. d'Afr. Eqt.)	Company rig	0
MOROCCO	AGIP Mineraria	Company rig	1
	SCP (Ste. Cherifienne des Pet.)	Forex	0
	SCP (Ste. Cherifienne des Pet.)	Company rigs	3
NIGERIA	Shell-BP Pet. Dev. Co. of Nig.	International Drlg. Co.	1
	Shell-BP Pet. Dev. Co. of Nig.	Drilvo	1
	Shell-BP Pet. Dev. Co. of Nig.	Company rigs (8 more rigs on completions)	3
PORT. GUINEE	Esso Expl. Guinee	Drillexco	1
SENEGAL	Ste. Petroles Du Senegal	Forenco	1
	SAP/COPAREX/Continental/Cit. S	Company rig	1
SOMALIA	Sinclair Somal Corp.	International Drlg. Co.	1
SP. SAHARA	Gulf Oil/Cepsa	Falcon-Seaboard Drlg. Co.	0
	Union Oil Co.	Unknown	1

*This breakdown includes only rotary rigs making new hole on exploratory and development locations. Cable tool rigs and rigs on workovers are not included.

EUROPE*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
AUSTRIA	OeMV (Austrian government)	Company rigs	14
	RAG (Mobil/Shell)	Company rig (Unit Rig U-15 Skid)	1
	Voralberger (gov't/private)	Preussag	1
FRANCE	COPESEP	Ste. Languedocienne	2
	COFEPA	Forafrance	1
	COFEPA	Company rig	1
	Esso REP	Ste. Languedocienne	2
	Esso REP	Forex	1
	Esso REP	Sogefor	0
	Esso REP	Company rig	0
	CEP	Ste. Languedocienne	1
	CEP	Forenco	0
	CEP	Company rig	1 (est.)
	SAFREP	Company rig	1
	SNPA	Company rigs	3
	CEP	Forenco	1 (est.)
	PETROREP	Company rig	1
	RAP	Company rigs	4
	RAP	Cofor	1

Camdrill moves this Desert Star rig on four trailers. Since the unit is designed for desert operation, road width and load limit restriction are not involved

seven rigs, mostly working on development drilling.

Africa: The center of the world's exploratory activity has evidently shifted to Africa, or is on its way there. Libya leads the area in interest, if not in the number of rigs. There seems to be some reluctance on the part of the companies there to say exactly how big their discoveries really are, but they must be very large indeed if rumors bear any fruit. The largest driller is Oasis Oil, owned by Ohio, Continental and Amerada companies, all independents from the United States. It has rigs running in several concession areas and is followed closely in number of rigs by Esso which has two companies, Esso Libya and Esso Sirte, the latter 50% owned by Grace and Texas Gulf Producing. Some 18 other companies are there as well, plus an unspecified number awaiting the grants which will soon follow on relinquished areas.

Algeria has a drilling industry of its own, with about 43 rigs running. Many of them belong to CREPS, the discoverer of the Edjele and other fields far to the south. Many of the drilling contractors are French, using mainly American equipment.

Other activity is scattered around among less important areas, for example in Angola where Petrofina is continuing its oil search. In Egypt companies mainly representing local and Government interests are active. Nigeria continues to develop, and the recent application for exploratory licenses there will stimulate drilling as soon as final grants are made.

Esso continues to explore Portuguese Guinée, so far without success. The Spanish Sahara has attracted attention and several shallow wildcats have been drilled.

Europe: Little "big oil" has been found in Europe, but the oil hunt goes on just the same. The proximity of the world's biggest importer of crude has a stimulating effect on explorers, and the high prices paid within that market for oil do nothing to deter them either. Many companies have not entered the European area to explore, however, reasoning that they only want to explore where there are reasonably good chances to find large oil fields that will produce half a million barrels a day or so. Even if it is cheaper than oil found in Europe the end profit is much greater.

France has about thirty rigs running and is generally very active. The government is

participating in the oil search, and a number of French contractors have begun operations in a very efficient manner, among them the Ste. Languedocienne, Forafrance, Forex, Sogefor and others.

Germany likewise has an active drilling industry, more than twice the size of the French but little is said about it. For some unknown reason the statistics dealing with contractors operating, the number of rigs currently in use, locations, etc. are considered confidential and not available for general distribution. There are about seventy heavy rigs estimated to be in use, however, plus about 150 light rigs. They belong mostly to the companies there, contractors doing only about 7% of the drilling.

The other countries of Europe are also active. Italy has about 33 rigs running, many of them on the Sicilian fields and gas areas of northern Italy. Netherlands has three rigs, and may soon have more since new concessions have been granted and important gas finds made by NAM, the Jersey/Shell affiliate operating there. Austria continues at a slow pace, and Greece is seeing her first exploratory activity in some time as Esso's rig goes in for oil, with the understanding that any artifacts found during the process will be turned over to the government.

Latin America and The Caribbean: For years the extreme north of South America has had a near-monopoly on oil interest in this area. Venezuela, in particular, has been a center of activity but in recent years has fallen off. Argentina has surged ahead to take first place as the center of oil industry attention and Bolivia, landlocked as it is, now has two important new discoveries which may mean enough oil to build the major pipeline necessary to get it out.

Argentina's contract system is bringing prosperity to the country, and in this year the government estimates oil production will meet oil consumption. Governments are always optimistic about these forecasts, but in any case the $250 million yearly import bill for oil is declining fast and this year may almost disappear. Several oil finds are responsible, the Pan American operations in particular and those of Tennessee Argentina. The private contractors are only small potatoes compared with the government's operation, YPF, which has more rigs running than all the private companies put together. The Italian company, SAIPEM, has been operating with considerable efficiency and there seems to be a three-way competition on a friendly level between them, the Americans and YPF. Principal beneficiary is YPF which has trebled its drilling efficiency by observing the others at work.

Bolivia has a good discovery by Gulf and one by Chaco to point at and drilling is looking up. Brazil is plugging along at its old line, with Petrobras running a large amount of rigs but still no discoveries have been made. Colombia has a new oil code which will certainly slow activities there, despite a recent good oil find. Chile con-

EUROPE* (Continued)

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
FRANCE (Cont'd)	SN Petroles Aquitaine	Company rigs	3
	SN Petroles Aquitaine	Forex	1
	Fropex	Company rigs	2 (est.)
	Prepa/Transworld Petroleum	Unknown	0
	Sirep	Forex	1 (est.)
	Cie. Francaise Petroles Norm.	Forasol	0
	Unknown	Unknown	4
GERMANY (WEST)	The detailed breakdown of company and contractor is confidential and has not been released. The total shown includes the below operating companies and contractors, based on published information.		70 (est.)
	Oil companies drilling as operators include: Gewerkschaft Brigitta; Deutsche Erdol AG; Mobil Oil AG in Deutschland (6 company rigs, one contractor rig working, including three Wirth rigs, one SMG, one Ideco 7-11 rig); C. Deilman Bergbau; Gewerkschaft Elwerath; Wintershall AG (Haniel & Lueg contractors have three rigs running for them); and Preussag, Preussische Bergwerks und Hutten AG.		
	Contractors do about 7% of the drilling in Germany. Some of the known contractors include: Haniel & Lueg (see above); Ferdinand Kolle und Sohn (3 rigs); Braunschweigische Bohrgesellschaft; Herman von Rautenkranz (ITAG) (seven heavy rigs, plus three working abroad through subsidiaries PERFGO in Italy and Spain).		
GREECE	Regie, Aut. des Pet.	Company rig	1
	Esso Hellenic	Company rig	1
ITALY (Incl. SICILY)	Gulf Italia Co.	Cia. Mediterranea di Perforazione	2
	Adriatic Petroleum (Cities Serv.)	Cia. Mediterranea di Perforazione	0
	SIPO (AGIP affiliate)	Cia. Mediterranea di Perforazione	2
	Monte Amiata, S.p.a.	Cia. Mediterranea di Perforazione	4
	Idrosud, S.p.a.	Cia. Mediterranea di Perforazione	3
	AGIP Mineraria	Company rigs	33 (est.)
	Additional contractors known to be operating are listed below. No information is available at this time to indicate for whom they are drilling: Delta Drilling Overseas Co. (has two Emsco GB 500 rigs, one A 800); Peregeo (one Caldwell) C3, (one Wirt 20/8); CLEIM (one Masserenti RSD rig); Forenco (one titan rig).		
NETHERLANDS	NAM (Nederlandse Aardolie)	Company rigs	3
	Rigs include one Ideco/Woodfield E-525 D double drum rig, driven by a DC electric motor; one Ideco H-30—SC single drum Hydrair hoist; one Ideal 100 rig, driven by AC squirrel cage induction motor through variable blade torque converter.		
SPAIN	Campsa/Caltex	Campsa	1
	Valdebro	Company rigs	2
	INI	Unknown	1
	Adaro	Unknown	1
	Copsa	Unknown	3
	Cia. Pet. Iberica	Unknown	3
	American Overseas	S.L.F.P.	1
SWITZERLAND	BP Exploration (Fribourg) S.A.	Forenco	0
	Ste. des Hydrocarbures (PREPA)	Company rig	1
	SEAG	Deutsche Elwerath	0
UNITED KINGDOM	British Petroleum	Company rigs	7
YUGOSLAVIA	Unknown	Unknown	22 (est.)
COMMUNIST BLOC	(Estimated)		
	USSR		1,000
	Hungary		40
	Poland		20
	Czechoslovakia		50
	Albania		8
	East Germany		6
	Romania		100
	Total		1,224

*This breakdown includes only rotary rigs working on locations. Cable tool rigs and rigs on workovers are not included.

LATIN AMERICA & CARIBBEAN*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
ARGENTINA	YPF (Yac. Petrol. Fiscales)	Southeastern Drlg. Co.	5
	YPF	Kerr-McGee Oil Ind. Inc. (Emscos)	2
	YPF	Company rigs	72
	L. & R. Development Co. Ltd.	Transworld (Nat. 75's)	2
	Esso S.A.P.A.	Company rigs	2
	Cia. Astra de Petroleo	Company rigs	2
	Tennessee Argentina S.A.	Laughlin Porter	4
	Saipem (Agip Mineraria sub.)	Company rigs	5
	Pan American Arg. Oil Co.	Loffland Bros. Co.	4
	Shell Prod. Co. of Arg.	Company rig	1
BOLIVIA	YPFB (Yac. Petrol. Fiscales Bol.)	Company rigs	11
	YPFB	Big Chief Bolivian Drlg. Co.	1
	Bolivian Gulf Oil Co.	Big Chief Bolivian Drlg. Co.	1
	Bolivian Gulf Oil Co.	Parker Drilling Co.	2
	Chaco Petroleum, S.A.	Loffland Bros. Co.	1
	Uniao Braz.	Kerr-McGee Oil Ind. Inc.	1
	Shell/Bolivcal Companies	Loffland Bros. Co.	1
BRAZIL	Petrobras (Petroleos Brasil.)	Company rigs	35
	Petrobras	Drilexco	3
	Petrobras	Haney Williams Drlg. Co.	3
	Petrobras	Geo. Perforadora	2
	Petrobras	Brantley Drilling Co.	2
	Petrobras	Parker Drilling Co.	1

BRIT. HONDURAS	Phillips Oil Co.	Offshore Drlg. Co.	1
CHILE	ENAP (Empresa Nacional)	Santa Fe Drilling Co.	1
	ENAP	Loffland Bros. Co.	1
	ENAP	Company rigs	3
COLOMBIA	Colombia—Cities Serv. Pet.	An-Son Drilling Co.	1
	International Pet. Co. Ltd.	Company rig	1
	Texas Petroleum Co.	An-Son Drilling Co.	0
	Texas Petroleum Co.	Loffland Bros. Co.	1
	Texas Petroleum Co.	Company rigs	5
	Colombian Petroleum Corp.	Loffland Bros. Co.	1
	Colombian Petroleum Corp.	Company rig	0
	Empresa Colombia de Pet.	Company rigs	4
	Shell-Condor	Stoca Drlg. Co.	0
	Mecom	Santa Fe Drlg. Co.	1
	Sinclair/B.P.	Loffland Bros. Co.	4
	Tennessee Gas	Loffland Bros. Co.	1
COSTA RICA	Cia. Petrolera de Costa Rica	Drilling & Exploration Co.	0
CUBA	Cuban Petroleum Institute	Company rigs	6 (est.)
ECUADOR	Tennessee del Ecuador S.A.	Company rig	1
	Anglo Ecuadorian Oil Co.	Company rigs	2
GUATEMALA	Ohio Oil de Guatemala	Brown Drilling Co.	1
	Signal Oil Co.	Santa Fe Drlg. Co.	0
MEXICO	Pemex (Petroleos Mexicanos)	Company rigs	73
	Pemex	Contract rigs	41
	Contractors working for Pemex are as follows, with number of rigs and area in parentheses: Perforadora Mendez (Permesa) (4: 2 Reynosa, 2 Tabasco); Perforadora Mexico (4: 2 Tabasco, 2 Poza Rica); Perforadora Reynosa (2 Tabasco); CIMA (2, Vera Cruz) Isthmus Dev. (3, stacked); Perforadora Mexicana (2, Poza Rica); Pauley Pan American (2, Reynosa); Perforadora Latina (6: 1 Tamaulipas, 5 Poza Rica); Servicios Petroleros (3, Vera Cruz); Perforadora Cerro Azul (3, Vera Cruz); Perforadora La Central (3: 2 Tamaulipas, 1 Cerro Azul); Sharmex (2, Poza Rica); Perforadora Anahuac (2, Reynosa); Perforadora Otila (2, Reynosa).		
PANAMA	Delhi Taylor Co.	An-Son Drilling Co.	0
PERU	International Petroleum Co.	Company rigs	4
	Belco Petroleum Co.	So. American Drlg. Co. (Stoca)	2
	Peruvian Pacific Pet. Co.	Santa Fe Drlg. Co. (offsh.)	1
	Cerro del Pasco	Ross Cabin Assoc.	1
	Empresa Petrolera Fiscal (Govt.)	Company rigs	3
	Mobil Oil Co./German group	Loffland Bros. (Unit Rig U-15)	1
	Mining companies (various) (not drilling for oil, not incl. in total)		12
PUERTO RICO	Kewanee Commonwealth	Unknown	1
TRINIDAD	Apex	Company rigs	3
	Kern Trinidad Oilfields, Ltd.	Company rig	0
	Trinidad Pet. Dev. Co. Ltd.	Company rigs	4
	Trinidad Pet. Dev. Co. Ltd.	Skinner Drilling Co. Ltd.	1
	Texaco Trinidad, Inc.	Company rigs	5
	Texaco Trinidad, Inc.	Skinner Drilling Co. Ltd.	1
	Texaco Trinidad, Inc.	Southern Drlg. Co.	2
	Shell	Company rig	1
	Trinidad Northern Areas, Ltd.	Santa Fe (all offshore)	2
	Trinidad Northern Areas, Ltd.	Skinner Drlg. Co.	1
	Texaco Brighton	Skinner Drilling Co.	1
	Premier Consolidated Oilflds.	Skinner Drilling Co.	1
VENEZUELA	Texas Petroleum Co.	Santa Fe Drilling Co.	2
	Texas Petroleum Co.	Delta Drilling Co.	1
	Mobil Oil de Venezuela	Loffland Bros. (Nat. 125 tender)	1
	Mobil Oil de Venezuela	Company (Unit rig 914 skid)	1
	Venezuelan Sun Oil Co.	Delta Drilling Co.	1
	Phillips Petroleum Co.	Santa Fe Drilling Co.	0
	Mene Grande Oil Co.	Company rigs	6
	Mene Grande Oil Co.	Loffland Bros. Co.	1
	Mene Grande Oil Co.	Offshore Drilling Co.	1
	Creole Petroleum Corp.	Company rigs	6
	Cia. Shell de Venezuela	Company rigs	7
	Sinclair Venezuelan Co.	Belmerich & Payne	1
	Atlantic Refining Co.	Delta Drilling Co.	1
	Richmond Petroleum Co. de Ven.	Delta Drilling Co.	1
	Richmond Petroleum Co. de Ven.	Santa Fe Drilling Co.	1
	Signal Oil & Gas Co.	Kerr McGee	1
	Signal Oil & Gas Co.	Loffland Bros. Co.	1

*This breakdown includes only rotary rigs working on exploratory and development locations. Cable tool rigs and rigs on workovers are not included.

NORTH AMERICA*

Country	Operating Company	Contractor or Company Drilling	Number of Rigs
ALASKA	Socal/Richfield	Rowan Drilling Co.	2
	Socal/Richfield	Coastal Drilling Co.	2
	Richfield Oil Corp.	Clyde Hall Drilling Co.	1
	Colorado Oil & Gas Corp.	Company rig	1
	Union/Ohio	Coastal Drilling Co.	1
	Socal/Richfield	Reading & Rates Drlg. Co.	3
	Pan American Pet. Corp.	Rowan Drilling Co.	1
CANADA	Various. Breakdown available in AAODC report	Various. Breakdown available in AAODC report	144
UNITED STATES (excl. Alaska)	Various. Breakdown available in AAODC report	Various. Breakdown available in AAODC report	1,813

*This breakdown includes only rotary rigs working on exploratory and development locations. Cable tool rigs and rigs on workovers are not included.

tinues to operate her government company but production has remained low with no discoveries reported. Cuba, under the Castro spell, releases no news about oil results but Russian rigs are reportedly working and exploration underway with Soviet technicians.

Mexico has continued its oil hunt, although operations slowed down in 1961 after the Pemex treasury ran out of funds for drilling. The oil industry is a monopoly under the government's Pemex and the contractors working there are all under Pemex employ. Some of them are quite important, for example the Pawley interests in CIMA which have been taken over in half by Continental Oil. The CIMA and other contract rigs total about 41, the remainder of Pemex rigs are company-owned. The company operates drilling schools in several locations and the rigs are mostly Mexican-staffed.

Peru has continued its interior hunt in the Montana area where the Mobil company and a German group spudded a wildcat in the remote Montana region recently. A number of other companies are drilling along the coast.

Trinidad has steadily increased her production and just as steadily increased her drilling rig totals. Latest to add was the offshore drilling in the east, where Pan American and Dominion Oil have concessions. On the other side of the island Dominion is drilling along the Gulf in an effort to increase their original oil find there.

Venezuela has declined in activity levels but production has held up and increased as have profits of most of the companies operating there, according to reports from Caracas. The number of drilling rigs has gone down to 33, of which Mene Grande, Creole and Shell operate most. The government's new oil company has spudded a well in the Lake on acreage considered almost certain to be productive.

North America: The United States has long had over half of the world's drilling rigs operating within its borders, and continues as the world's largest driller although the remainder of the world is fast overtaking her. Alaska, now a State of the United States, occupies a particularly important spot, although only about 11 drilling rigs are operating. The production obtained can be brought into the US without being subject to import quotas and the companies exploring do not need to be told this. California Standard/Richfield Oil have had the best success and between then are operating about eight rigs to extend their initial discovery. Some gas has been found as well which will be welcome in Anchorage town when winter arrives.

Canada's drilling industry is in the doldrums as is to be expected when the thaw comes in the summer months and makes much of the muskeg area unpassable to vehicles. The recent liberalization of regulations governing the Far North and the Arctic Islands should stimulate operations there and exploratory activities in the summer will compensate somewhat for the decline in Canada's south during the warm months. END

Aerial view of OeMV's new 36,000-b/d refinery near Viénna

The asphalt plant at Schwechat, consisting of two 1,050-b/d vacuum distillation columns

New Austrian refinery now onstream at Schwechat

by Rudolf Sobotka

The Author

Dr. Rudolf Sobotka was born in Czechoslovakia and studied at the University of Vienna. Since 1951 he has been a political commentator at a radio station, editor of an American news agency, and now is chief editor with the United States Information Service in Vienna. His special fields are policy and economy of Soviet bloc countries and of Central Europe. He has contributed extensively on these subjects to European and American newspapers and magazines.

AUSTRIA'S FIRST major petroleum refinery, the new $22.4 million, 36,000-b/d refinery of Oesterreichische Mineraloelverwaltungs A.G. (OeMV) at Schwechat, near Vienna, went on-stream last January 1961. Construction of the plant, consisting of a crude distillation and a reforming unit, an asphalt and an LPGas plant, a power house and storage and loading facilities, had been under way since April, 1958.

To date, the state company OeMV, which produces about 99% of the crude in Austria, has been operating four company-owned refineries (Moosbierbaum, Voesendorf, Schwechat, Korneuburg), with a combined capacity of 28,210 b/d, about 60% of the total capacity, and an 8,810 b/d refinery leased from Shell/Vacuum until the end of 1960.

The capacity of the new Schwechat re-

finery was fixed at 36,000 b/d, because: (1) it was to be able to replace the four outdated plants, and (2) it was to correspond to the expected average crude yield in Austria during the next 10 years.

OeMV's four old refineries—they were built between 1925 and 1943, partly destroyed during the war and rebuilt after 1945—are eventually to be shut down or adjusted to new production tasks. For instance, the old Schwechat refinery, consisting of an atmospheric and a vacuum distillation units, a lube plant, and a thermal cracking unit, has been incorporated into the new refinery.

Several factors decided in favor of locating the new refinery close to the old Schwechat plant, although the soil conditions made ground stabilization necessary. The decisive points were: (1) connection to the existing pipeline system, (2) existence of road, railroad, and port facilities, (3) nearness of Vienna, which made construction of living quarters for personnel unnecessary, and (4) availability of storage facilities amounting to 7,802,700 cu ft at Lobau, on the opposite bank of the Danube River.

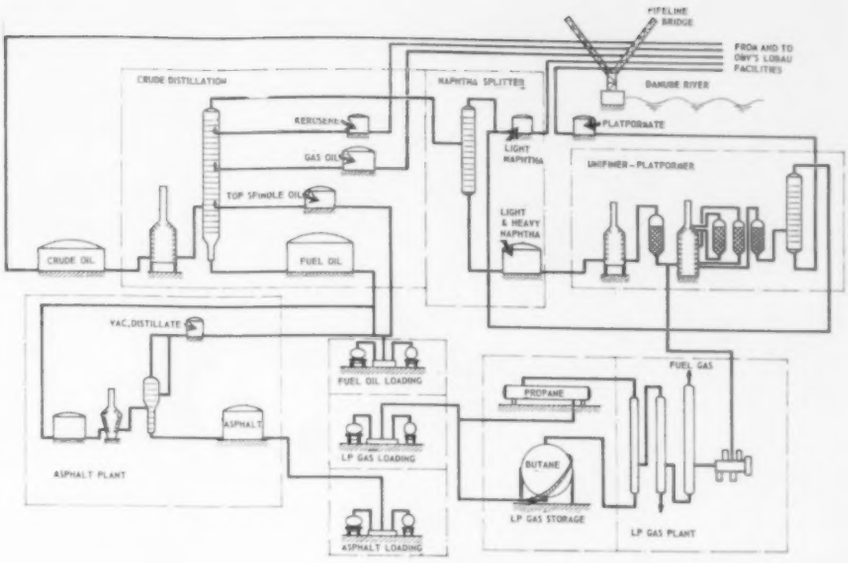
Calculations have shown that the operation of the new refinery is financially justifiable even if one-third of the crude stock has to be imported. Compared with the old refineries, OeMV will save annually by the operation of the new refinery $1.4 million in transportation and $1 million on account of lower energy consumption. In all, savings will amount to $6 million per year, leaving OeMV more money for exploration.

Schwechat refinery will face no marketing problem: Within its range of 120 miles are consumed in Austria 75% of the gasoline, 85% of the fuel oil, and 80% of the gas oil. Despite the new plant, imports of petroleum products will continue in the coming years and even increase. However, it is intended to add 18,000 b/d of capacity to the new refinery if the domestic crude output and/or marketing conditions warrant such an operation.

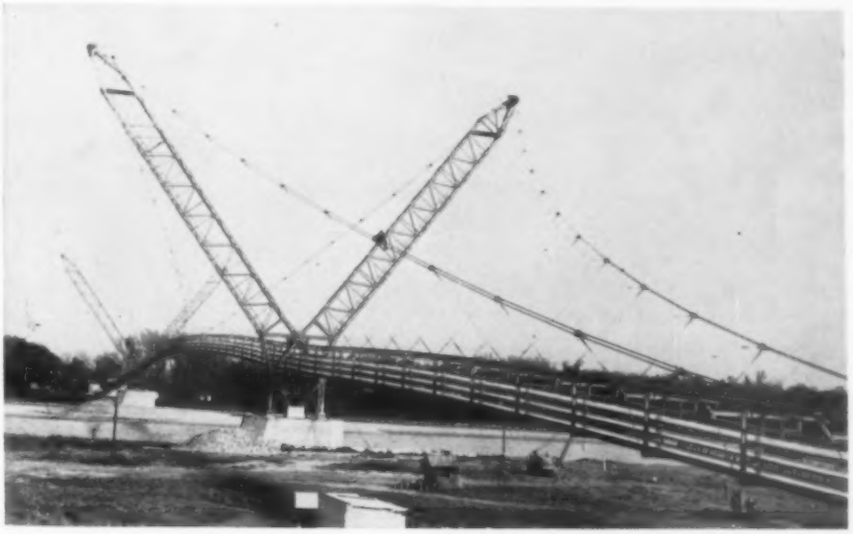
The refinery has been designed by Lurgi GmbH, Frankfurt/Main, West Germany. OeMV chose this firm because of the good experience it had with Lurgi in the past in connection with other projects. The reforming plant was built under license of Universal Oil Products Co., Des Plaines, Ill., USA. In this case, technological considerations, which made the UOP process appear most economical, were decisive. The cooperation with Lurgi and with UOP has been excellent and exemplary.

Some 140 firms have participated in the construction of the refinery of which 80% were Austrian. The major foreign firms were Claudius Peters (furnaces) and Mannesmann (steel piping), of West Germany, and Foxboro (meters) and Worthington (pumps), of the USA. The major Austrian firms were Maschinenfabrik Andritz (compressors, steel construction), Alpine-Montan (fuel oil tanks), Wiener Brueckenbau (compressors, floating roof tanks), Waagner-Biro (condensers, coolers, heat exchangers),

(Continued on page 59)

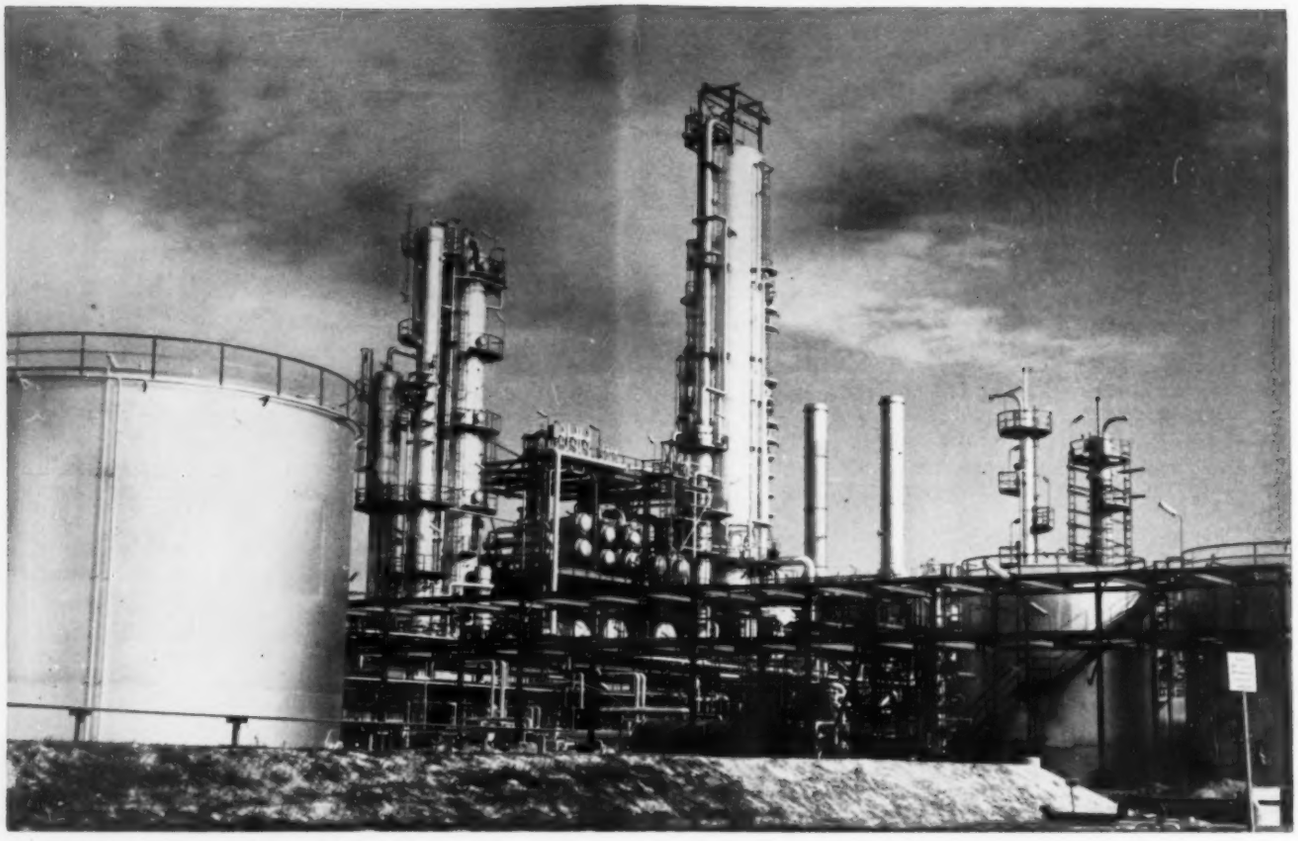


Schematic flow chart of processing at the OeMV refinery at Schwechat



An 853-ft long bridge carries 13 pipelines across the Danube, connecting refinery with storage tanks at Lobau

Atmospheric crude still at right, power house at left, and cooling tower at left center, with Danube River in background



View of the Austrian government's new refinery at Schwechat

Austria's petroleum industry

by J. W. Scott
Petroleum Consultant, Vienna

Oil development in Austria continues to grow. The government's new refinery came onstream in 1961 and consumption last year rose 17%

In 1913 in gbely (Egbell) in Slovakia, near the border of the province of Lower Austria oil was discovered for the first time in the late tertiary Vienna Basin lying between the Alps and the Carpathians in which there are marine deposits of some 5000 meters. Although considerable geological work was accomplished in the 1920's, it was only in 1934 that commercial deposits were discovered in Steinberg near Zistersdorf on the Eastern side of the Danube near Vienna. By the time of the Anschluss in 1938, extensive geological and geophysical surveys had been carried out and a considerable number of wells drilled. Furthermore, exploration rights (Freischuerfe) covering virtually the entire Vienna Basin, the adjoining Alpine foothills, parts of Upper Austria and Styria had been taken out, a large share of which by British and American companies, notably the jointly held Socony-Shell subsidiary, the Rohoelgewinnungs A.G. (R.A.G.), an affiliate of the Standard Oil of New Jersey, the Austrogasco, the R. K. Van Sickle, a Canadian national. In the year of the Anschluss, however, production had only reached 57,000 tons. During the war, for military reasons, all efforts were concentrated on exploitation and by 1943, production increased to over 1,200,000 tons annually, or approximately 24,000 barrels daily.

In August 1938, the Germans promulgated the Bitumen Law for Austria which established a new legislative basis for exploration and exploitation. This law was retained by Austria after the war and is still in effect. Under this legislation, all then existing petroleum exploration rights were to expire on July 31, 1940, provided no exploitation rights were applied for by that time. After the latter date during the war

years, except for the very limited areas of the then producing fields covered by previously issued exploitation rights, concessions were issued to German companies covering almost all of the Vienna Basin, the Alpine foothills and two areas in the Graz Basin in Styria. There were taken over by the Russians after the war as "German Assets" notwithstanding the fact that a very large part of the areas were owned by American and British companies prior to the War. The Russians based their claim on Potsdam Agreement of August 2, 1945, notwithstanding the fact that the London and Moscow Declarations of 1943, also signed by Russia, provided for the restoration of such properties to their pre-Anschluss Western owners.

In 1945, as a result of the complications and confusion at the end of the War, including the seizure by the Russians of oilfield equipment as war booty, the crude production was only 448,000 tons. Thereafter, the annual output gradually increased and with the discovery of the Matzen Field in 1949 reached a total of 1,160,000 tons in that year. The Matzen and neighboring discoveries at Prottes, Schoenkirchen, Bockfliess, Auersthal and Raggendorf by 1951 constituted 50 percent of the Austrian production and by 1955, 78 percent. In 1950, Aderklaa was bought in as a small oil field and in 1952 there was an important gas discovery in Zwerndorf. In the meantime, R.A.G. discovered commercial oil in Upper Austria, production of which started in 1956.

In keeping with the Moscow and Vienna Memoranda and the State Treaty of 1955, on August 13, 1955, all of the producing fields taken over or discovered by the Russians and the exploration rights seized by the Soviets were turned over to Austria under the condition that their ownership could not be assigned to foreign nationals. An Austrian State entity, the Oesterreichische Mineraloelverwaltung (OMV), the Austrian Mineral Oil Administration, was created to take over all of the oil properties held by the Russians. The maximum Austrian production was reached during the year of the State Treaty, 1955, with 3,660,000 tons. At the end of that year, the Austrian crude oil reserves were estimated to be 58.5 million tons and the gas reserves 30 billion cubic meters. During 1960, final agreement was reached between the Austrian Government and Shell and Soconv-Mobil whereby these two companies were paid $13 million ($6.5 million each) for the loss of their former extensive and valuable exploration rights in the Vienna Basin and adjoining areas. In addition, Shell and Mobil were assured 13 percent each of the total Austrian crude oil production, through their interest in the newly organized Oesterreichische Rohoelverwertungs G.m.b.H., the remaining 74 percent interest in which is held by the OMV. It is understood that Shell and Mobil have the right to certain special processing facilities of the new State owned Schwechat refinery on the outskirts of Vienna which is in the process of being completed and the present annual throughput capacity of which is 1,800,000 tons.

As mentioned, the Austrian State is prevented by the State Treaty from assigning ownership of exploration and exploitation rights covering most of the oil concession areas in the Vienna Basin and certain other areas to foreign nationals. Therefore, any foreign company wishing to obtain an interest in these areas, which constitute much of the area of petroliferous promise in Austria, can only do so through a joint operating agreement with the OMV. On two concession areas, Amstetten and Scheibbs, covering approximately 2000 square kilometers, granted in 1957 to OMV, both of which, however, were not on the list of properties in the State Treaty the assignment of which to foreigners was prohibited, B.P. entered into a joint operating agreement with the Government company. Since, however, no commercial discovery has been made during the exploration efforts in this area, it is reported that this agreement is in the process of being terminated.

Currently, exploration concessions are held (a) by the OMV in the Vienna Basin, Tulln-Klosterneuburg, Kilb, Amstetten and Scheibbs, (b) by R.A.G. which has 5 blocks in Upper Austria and one concession in Feldbach in Styria. In the Vorarlberg, Austria's most Westerly province, a 995 square kilometer concession was granted in 1957 to the Vorarlberger Erdöl Ges.m.b.H., a local company. In 1959, the Government approved a joint operating agreement between this company and PREUSSAG, a German corporation. Preussag recently drilled at its own expense one dry hole in this concession.

OMV has exploitation concessions in the Vienna Basin, R.A.G., two small pre-war producing fields, Gaiselberg and Zistersdorf in the Vienna Basin and producing areas in Upper Austria, and R. K. Van Sickle a small producing field granted before the war in the Vienna Basin. Since the peak year, 1955, when production totalled 3,660,000 tons, Austria's output has steadily declined, notwithstanding the discovery of commercial production by R.A.G. in Upper Austria and of one or two small fields in the Vienna Basin. In 1960, the total output was only 2,448,391 tons of crude oil. Gas production, however, has steadily increased, reaching a level of approximately 1.5 billion cubic meters in 1960.

Austria's Obligatory Crude Oil Deliveries to Russia: Under the State Treaty of 1955, in return for Russia's handing over to Austria of the majority of Austria's oilfields and exploration areas located in the former Russian occupied Eastern Zone, Austria agreed to deliver to Russia gratis, franco the Austrian border, ten million metric tons of oil in installments of one million tons per annum for ten years. In the meantime, however, this arrangement was modified as follows. During the first three years, one million tons per year were delivered. During the following three years whereas Austria continued to deliver one million tons per annum, Russia agreed to import into Austria gratis 500,000 tons of Russian crude per year. For the next three years, i.e., until approximately the middle of 1964, Austria has to deliver only 500,000 tons of crude annually to Russia. Thus the Soviets reduced the total Austrian oil payment to Russia from 10 million tons over a 10 year period to 6 million tons over a nine year period.

In keeping with the State Treaty, Austria also agreed to pay Russia $150,000,000 over a six year period for Russia's turning over to Austria of a considerable number of manufacturing (so-called U.S.I.A.) plants located in the former Russian occupied Eastern Zone, which the Soviets had also seized as German assets. Instead of paying this sum in dollars at the rate of $25,000,000 per annum as originally demanded, Russia permitted Austria to pay the equivalent of this sum in goods manufactured in the U.S.I.A. plants. Now that the six year period will be over in a few months and it would be virtually impossible for many of these plants to continue to operate without the Russian market which they have been supplying, Austria and Russia have concluded a commercial agreement whereby Russia has agreed to continue to accept the delivery of goods manufactured in these plants, for which, however, it will not pay cash, but crude oil, up to 500,000 tons per annum.

State Ownership in Austria: It is extremely interesting to note how political developments in Austria during and after World War II brought about State ownership of currently 92 percent of Austria's oil production, the most important exploration areas of petroliferous promise, over 80 percent of Austria's refining capacity and a considerable marketing organization in the province of Lower Austria.

In addition to State ownership of this large segment of the petroleum industry brought about the development described, in 1946, Austria nationalized a great many of the country's leading industrial enterprises, estimated by some to be almost 50 per cent of the entire Austrian industry, and by taking over the two leading banks it is said to control over 80 per cent of the banking business of the country. Most of the post war $1.3 billion U. S. rehabilitation aid to Austria, perhaps the highest per capita assistance given to any European country, paradoxically enough in view of the fact that America is the world's leading exponent of private enterprise, was given to Austrian State owned companies.

Austria's Crude Oil and Gas Production in 1960 and 1961: Austria's crude oil production in 1960 totalled 2,448,391 tons as compared with 2,458,784 tons in 1959, a decrease of only 10,373 tons or 0.42 per cent. Production in Lower Austria fell off 53,439 tons, whereas production in R.A.G.'s upper Austrian fields increased by 43,046 tons (227.5%) to 61,960 tons. This increase in the Upper Austrian production thus has just about offset what has been in recent

years a steady decline in the Vienna Basin production. It is anticipated that this trend will continue and that the Austrian production will be stabilized during the next few years at approximately 2.3 to 2.4 million tons. On the other hand, the demand for imported crude will increase in keeping with the current increase in consumption of approximately 17 per cent. Domestic production patently cannot keep up with the constant increase in consumption.

Austria's gas production in 1960 totalled 1.47 billion cubic meters as compared with 1.128 billion cubic meters in 1959 (an increase of 30 per cent) and 820 million cubic meters in 1958. 97 per cent of Austria's gas production is used by industry.

Reserves: Austria's crude oil reserves as of January 1, 1961, were estimated at approximately 34 million tons and gas reserves at a figure between 23 and 35 billion cubic meters taking into consideration recent disscoveries of gas deposits in Aderklaa.

Crude Oil Imports and Exports in 1960 and 1961: In 1960, Austria exported to Russia in keeping with its State Treaty obligation 1,002,300 tons of crude oil or 41 per cent of its production. Austria received from Russia in return 527,000 tons of crude. In 1961, deliveries to Russia will be approximately 750,000 tons or 30.6% of domestic production. Taking into consideration, however, Russia's anticipated deliveries to Austria of some 270,000 tons, four-fifths of the production will remain in Austria as compared with 40 per cent in 1956. Austrian crude is considerably more valuable than the imported Russian crude since the latter has a considerable sulphur content and yields only low octane gasoline.

Imports and Exports of Petroleum Products: In 1960, Austria's imports of petroleum products totalled 1,221,515 metric tons with a value of approximately $36,240,000. More than 50 per cent of the quantity with a value of 33.9 per cent of the total came from the Eastern Block. Italy was the second source with 43.6 per cent of the quantity and 43 per cent of the value. Other important countries of origin for high quality imports were West Germany, Holland and England. Austria's exports of petroleum products totalled 156,828 tons with a value of $5,300,000 in 1960.

Austria's Consumption in 1960: Austria's consumption of petroleum products in 1960 totalled 2,841,596 tons as compared with 2,423,072 tons in 1959, an increase of 17 per cent. Of this amount, 1,692,484 came from domestic sources and 1,149,112 tons were imported. An accompanying table indicates the details of the Austrian consumption.

AUSTRIA—OIL CONSUMPTION 1960
(metric tons)

Product	Total Consumption		Domestic Sources		Imports	
	1960	1959	1960	1959	1960	1959
Motor gasoline	586,549	504,909	293,127	256,613	293,422	248,296
Special gasoline*	15,908	16,437	6,220	6,953	9,688	9,484
Kerosine	15,348	16,426	15,348	16,426	—	—
Gas oil	531,827	461,359	478,644	436,446	53,183	24,913
Heating oil	1,459,863	1,224,138	761,215	734,489	689,648	489,649
Lubricating oils	103,295	88,936	65,283	53,806	38,012	35,130
Bitumen	128,806	110,867	72,647	58,205	56,159	52,662
Total	2,841,596	2,423,072	1,692,484	1,562,938	1,149,112	860,170

*Highly refined special white gasoline.

Refining: The annual throughput capacity of the three refineries at present in operation in Austria totals 2,180,000 tons, 83 per cent of which belongs to the Austrian State. Of the seven pre-war Austrian refineries: Kagran, Floridsdorf, Lobau, Korneuburg, Moosbierbaum, Vösendorf and Nova (Schwechat), only the first two, Kagran (Mobil Oil) and Floridsdorf (Shell) with throughput capacities of 180,000 and 200,000 tons respectively, are at present functioning and their capacity is being fully utilized. The old Schwechat (Nova) refinery with a capacity of 700,000 tons has been shut down except for one unit with an annual capacity of 16,500 tons which is being used for the processing of lubricating oils. The Korneuburg, Moosbierbaum and Voesendorf refineries have been shut down and it is understood will be dismantled. The Lobau refinery, with a capacity of 240,000 tons owned by the Oesterreichische Mineraloelwerke (OeMW not OmV), a joint Mobil-Shell affiliate, which has been rented to the OMV and was returned to its owners on January 1, 1961, is also shut down. The Lobau and old Schwechat refineries will be held in reserve for the time being in case of future need.

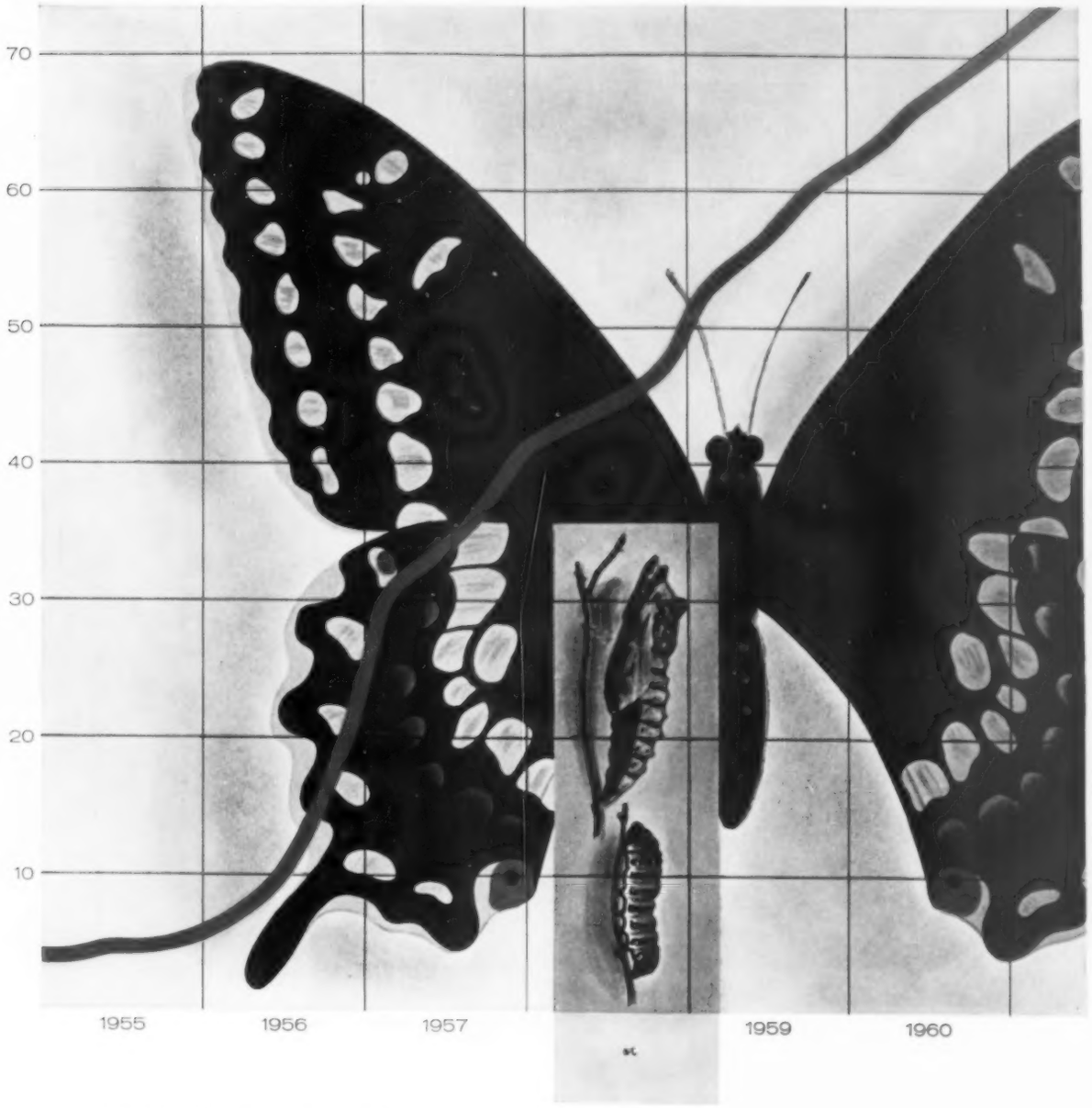
The new modern Schwechat refinery with a present capacity of 1.8 million tons is now in operation. It is anticipated that the entire plant as now planned, with a capacity of 2.6 million tons will be completed by the end of 1962. The catalytic reforming plant has gone into operation and gasoline of the highest octane rating can now be produced. By the second half of 1962, the catalytic cracking unit will be finished and Austria's entire demand for superior grades of gasoline can be produced locally. The gas processing unit should be completed in April, after which no more butane or propane will have to be imported. By 1962, from 18,000 to 20,000 tons of propylene can be produced making the Austrian petrochemical industry independent of imports. The Austrian refinery output in 1960 was 1,891,661 tons as compared with 1,815,563 tons in 1959. Domestic consumption of petroleum products on the other hand in 1960 as stated totalled over 2.8 million tons and is increasing at the rate of from 15 to 17 per cent per annum. At this rate of increase, assuming Austria's present refining capacity including the new Schwechat refinery, it is clear that more than a million tons of products will still have to be imported in 1961.

OMV's Activity: During 1960, OMV carried out seismic work with two of its own crews and gravity meter work with its own crew and a Prakla crew. Exploration drilling in St. Ulrich and Maustrenk was without noteworthy result. Of three wells drilled in Aderklaa, one showed the presence of both gas and oil. In fact the gas indications are said to be quite promising. A well drilled south of the Danube had negative results. The limits of the gas field discovered in Wildenduernbach in the Laa an der Thaya concession were ascertained by the drilling of three additional dry holes. Production in this field will start in the near future. OMV anticipates the drilling of 40,000 meters of exploration wells, 47,830 meters of development wells, 25,710 meters of step out wells and 19,000 meters of stratigraphic tests in 1961. It expects to expend some $3.3 million in exploration and exploitation work, $2.6 million in the development of its gas production and $20 million in refinery construction during the year.

OMV's crude oil production in 1960 totalled 2,252,440 tons as compared with 2,301,990 tons in 1959, a decline of 2.15 per cent. On the other hand its gas production increased from 1,318,000,000 cubic meters to 1,457,000,000 cubic meters. In 1961, OMV anticipates a crude oil production of 2,130,000 tons and a gas output of 1.5 billion cubic meters.

R.A.G.'s Activity in Upper Austria: Whereas R.A.G.'s production from its two pre-Anschluss exploitation fields of Gaiselberg and Zistersdorf in Lower Austria continued to decline slightly (1.37%) with a production in 1960 of 109,800 tons as compared with 111,325 tons in 1959, R.A.G. intensified its activities in Upper Austria where production increased from 18,914 tons in 1959 to 61,970 tons in 1960 (227.5%). Up to December 31, 1960, 35 deep wells had been drilled (68,813 meters) and seismic work totalled 10,116 shot holes (384,641 meters). Since the beginning of production in May 1956, R.A.G.'s cumulative production in Upper Austria as of January 1, 1961, was 92,928 tons. There are eighteen producing wells in Upper Austria of which 15 are in the Ried area. The average daily production is currently 1155 barrels or 64 b/d per well. R.A.G. recently acquired two new exploration concessions in the Pettenbach and Wels areas in which there is much exploration work to be done.

Van Sickle's Production: The production of R.K. VanSickle (independent Canadian), the other producer in Austria, declined from 26,555 tons in 1959 to 24,191 tons in 1960. END



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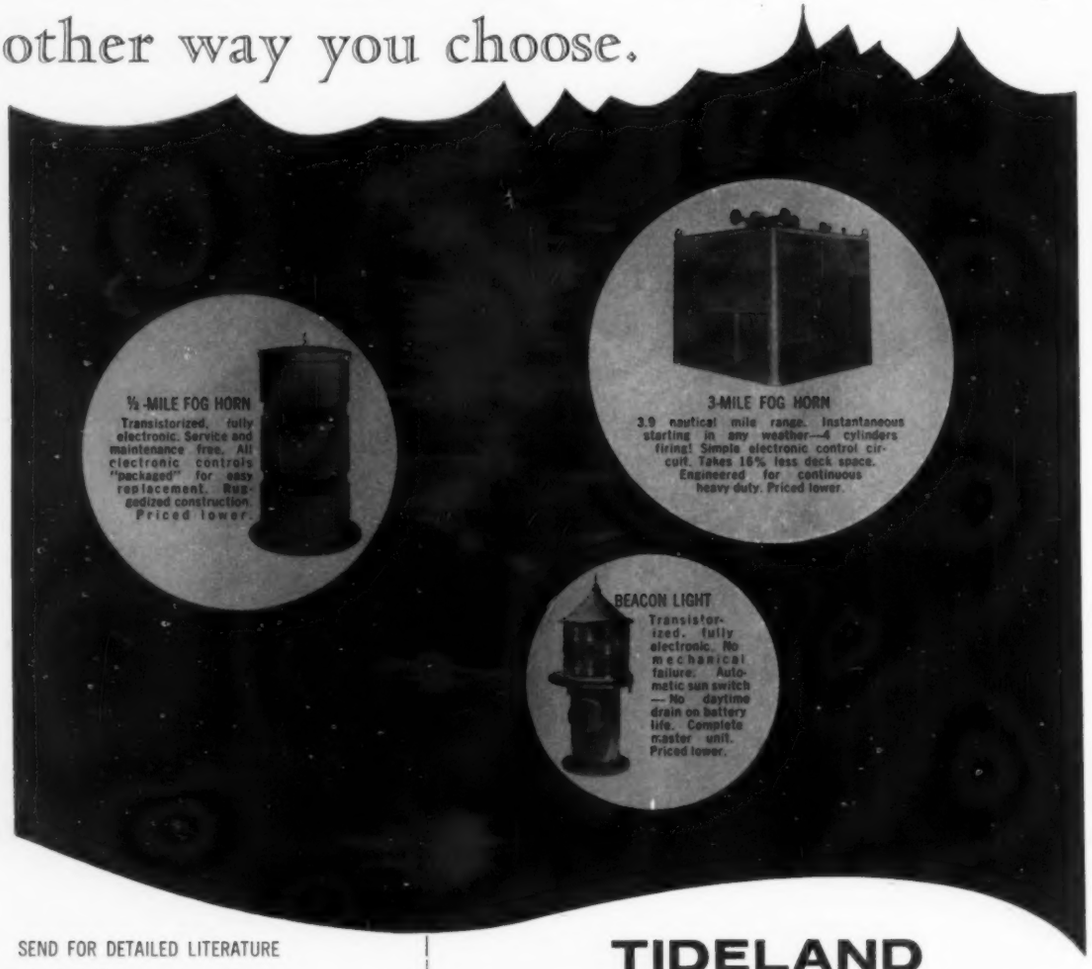
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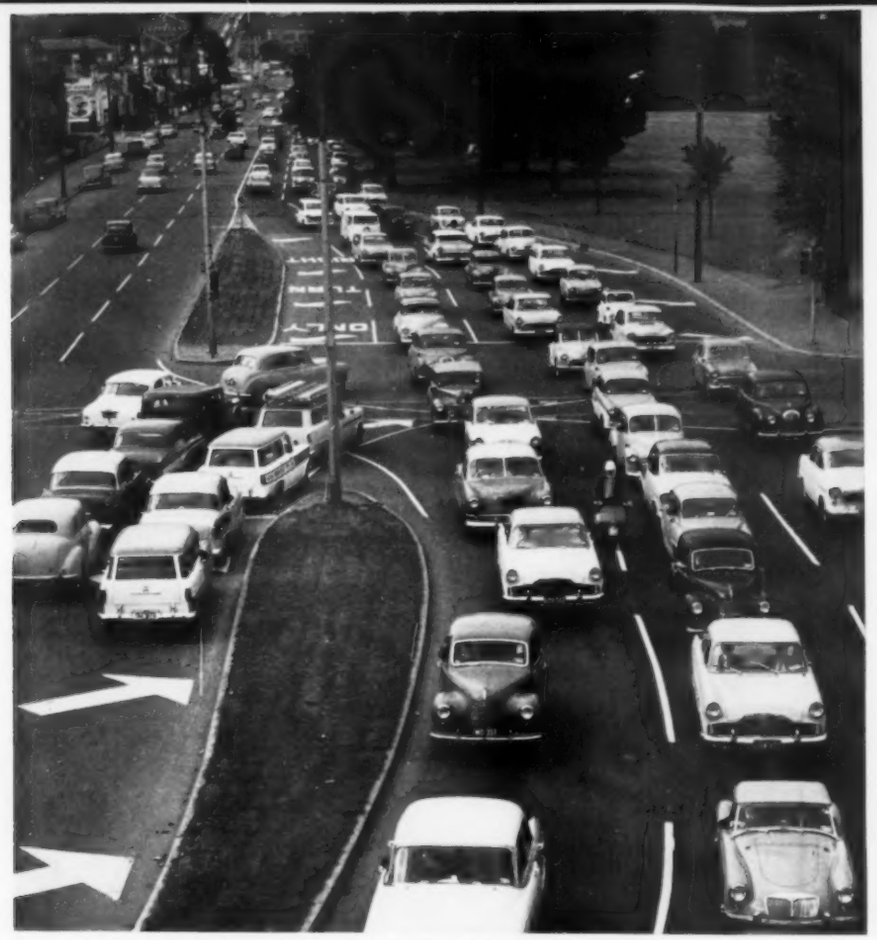
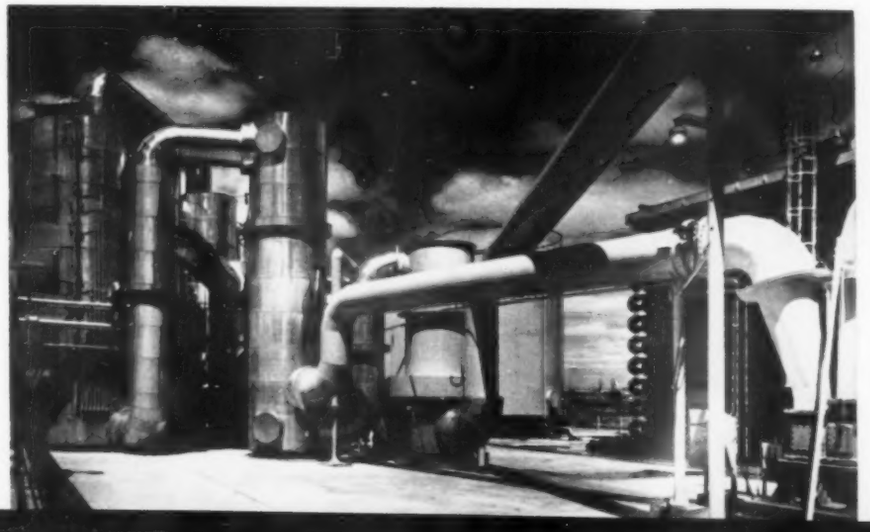


Traffic in Melbourne, Victoria, Australia is now the fourth most highly motorized country in the world, with one motor vehicle for every 3.8 persons

Main processing area of the Stanvac refinery at Altona, near Melbourne, which will also supply a number of near-by petrochemical plants now being built

Oil's important place in Australia's economy

Australia's first petrochemical plant was this 100 ton/day sulfuric acid unit of Shell Chemical at Geelong



PER CAPITA CONSUMPTION of petroleum products—often used to indicate the level of a country's standard of living—is higher in Australia (1,680 lb yr.) than anywhere else in the world except the North American and Scandinavian countries.

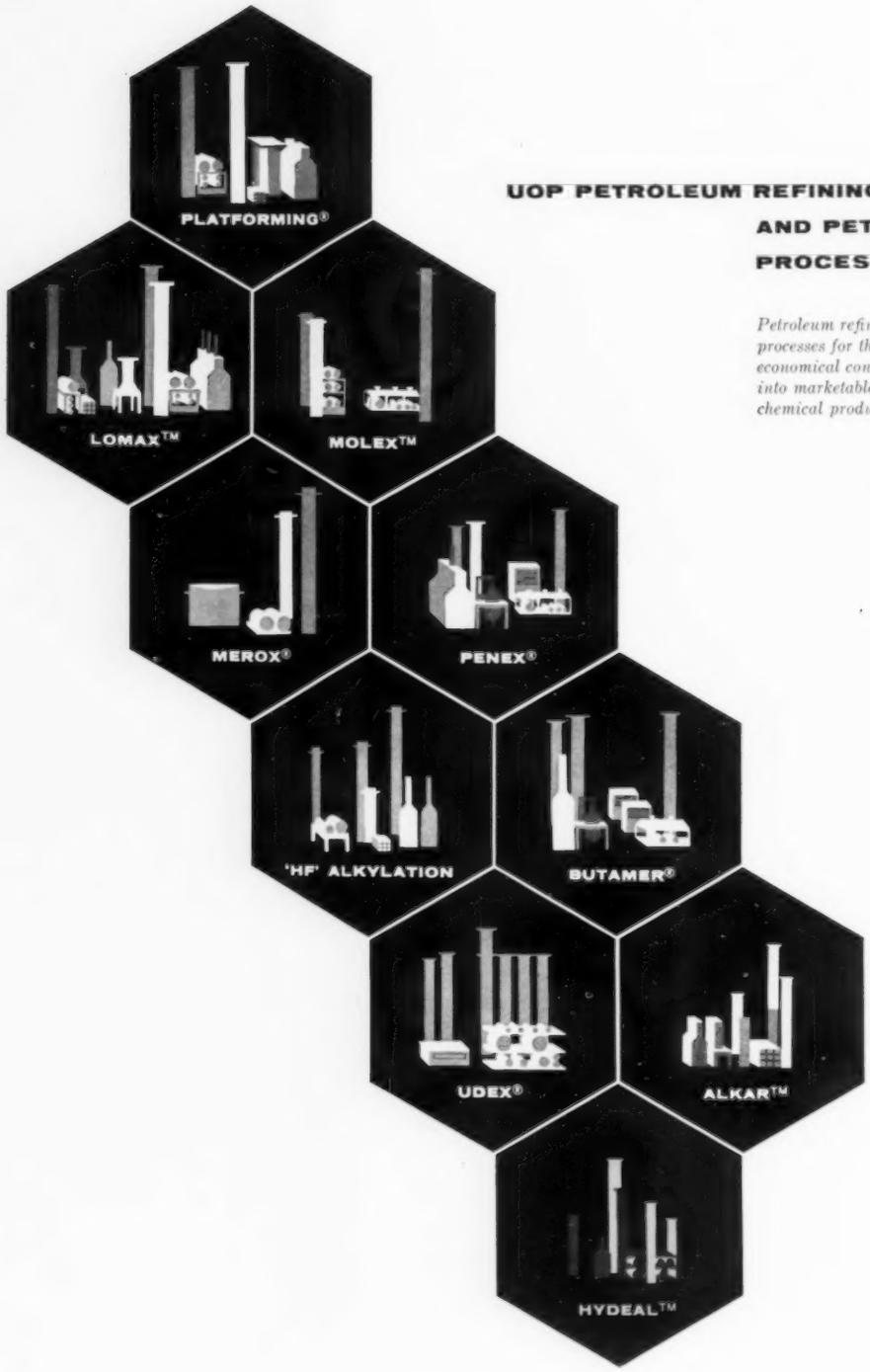
On the other hand, petroleum supplies a lower proportion of total energy requirements in Australia than in other leading oil-consuming countries, although the proportion has risen from 27% 10 years ago to 37% today.

The reason for this is that energy demands of industry, as distinct from transport, are still met principally by coal, of which Australia has abundant supplies. In this field these solid fuels supply two-thirds of the nation's needs (the proportion was three-quarters six years ago), compared with 23% for petroleum products and 7½% for hydroelectric power.

The very high level of consumption of petroleum products in Australia therefore reflects transport's important part in the whole industrial, commercial and social life of the country.

Great distances separate the main agricultural, pastoral and mining centers from the areas where the bulk of the country's population is concentrated, so that constant extension and modernization of road, railway and air services is vital.

There have been great improvements in Australia's land transport system in recent years through the use of larger numbers of heavy road freighters, mostly diesel-engined,



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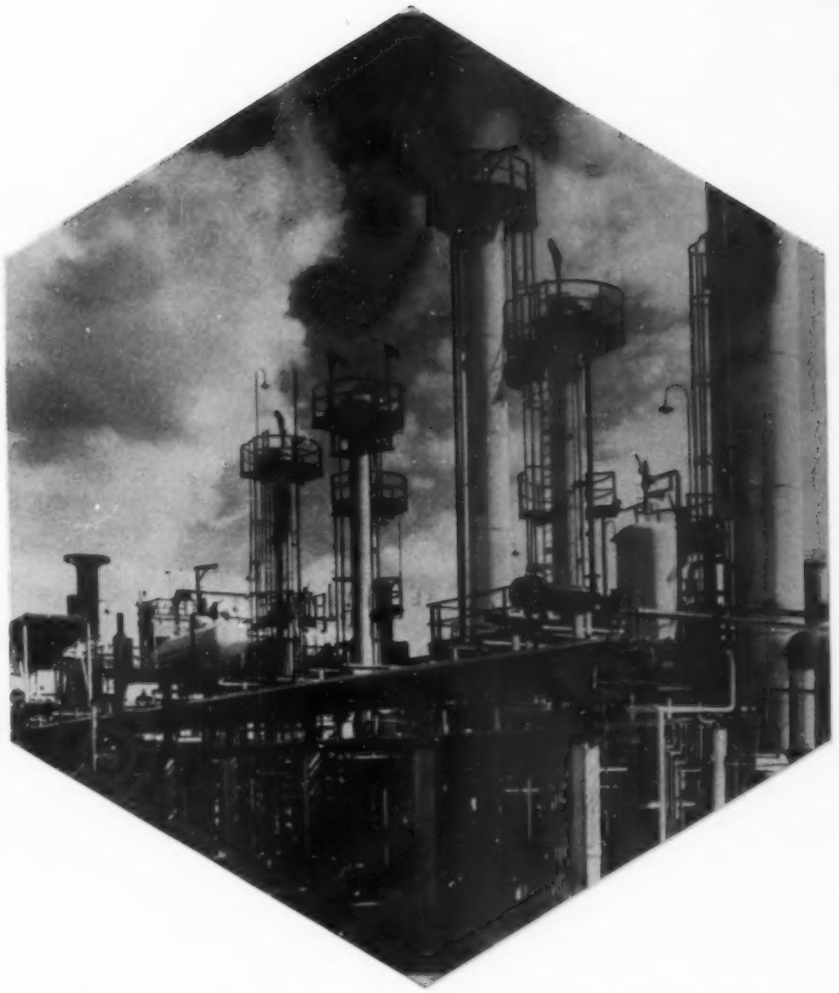
Petroleum refining and petrochemical processes for the efficient and economical conversion of petroleum into marketable fuel and chemical products.



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HYDEAL, a new process for the catalytic hydrodealkylation of toluene or xylenes, produces benzene of exceptional purity. Hydeal is also efficiently employed in the production of naphthalene from higher-boiling alkylnaphthalenes.

Hydeal serves a unique marketing need in petrochemical processing. Toluene, xylenes and heavier aromatic mixtures can now be efficiently and profitably converted to higher valued nitration-grade benzene. Benzene market demands by 1968 are expected to grow to more than three times those of toluene and xylenes. Hydeal is ideally suited to meeting this projected growth in benzene demand.

Exceptionally efficient, the Hydeal process, jointly developed by Ashland Oil & Refining Company and UOP, provides excellent yields and operates at economical utility requirements. Benzene yield from the hydrodealkylation of toluene is over 90% of theoretical, while that from xylenes is over 85% of theoretical. Moderate in capital costs, Hydeal offers refiners a ready use for excess toluene and xylenes.

UOP offers a wide range of petroleum and petrochemical processes to refiners everywhere in the free world. A variety of technical sevices is also available to assure the profitable performance of these processes. Let us evaluate your processing needs now.

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and through acceleration of the change-over from steam to diesel locomotives on the railroads.

Australia is one of the world leaders in air transport. Its air routes cover nearly as many miles as those of the USA, its people have come to use aircraft almost as casually as they do buses, and its air safety record is enviable.

Australia also relies heavily on shipping for transport of freight. Petroleum products themselves, carried mostly by foreign-owned tankers rather than vessels of Australian shipping companies, are responsible for a greater volume of this coastal freight traffic than all other commodities except coal.

Australia has 25 motor vehicles (excluding motor cycles) for every 100 persons, making it—after the USA, New Zealand and Canada—the fourth most motorized country in the world.

All these factors, together with the increasing use of heavy oils by secondary industry and electricity-generating authorities and the high level of mechanization achieved in primary industry, have contributed to the rapid rise in consumption of petroleum products in Australia—from 26,023,810 bbl in 1949 to 64,285,714 bbl last year.

Gasoline is the product in greatest demand, accounting for about 42% of total annual consumption. This is in contrast to Western Europe, where fuel oils predominate the pattern of consumption of petroleum products.

With no commercially exploitable deposits of oil yet having been found in Australia, the country is wholly dependent on overseas sources for its supplies.

Large refineries built. Emergence of large-scale oil refining industry in Australia since 1951 is one of the highlights of the country's post-war industrial expansion. Four of the large international oil companies—Shell and BP (British) and Caltex and Standard-Vacuum (American)—saw Australia as a politically stable country on the threshold of great developments, and between 1951 and 1956 each of them built a large modern refinery on Australian soil.

These refineries, which together cost £A130 million ($292 million) to build, changed the character of the Australian oil industry, and added greatly to the nation's industrial prestige.

Their construction stimulated progress in other industries, provided employment for thousands of Australians, reduced the annual outlay of overseas exchange by an estimated £A36 million ($81 million) and provided the basis for the manufacture of petrochemicals, an important new industrial development in Australia in the last 12 months.

The four refineries, located around the Australian coastline near the State capital cities, have all been expanded since original construction, and three more plants (two of them to concentrate on the production of lubricants) are to be built in the next few years at a total cost of £A35 million to £A40 million ($78 million to $90 million).

Sources of crude oil. Crude oil for these and three other smaller Australian refineries comes mainly from the Persian Gulf, Indonesia and British Borneo all of which, fortunately for Australia, lie east of the Suez Canal. Crude oil imports have increased steadily as the capacity of the refineries has been expanded, and last year reached a record of more than 61,905,000 bbl, costing £A71 million ($160 million) exclusive of freight.

With a further £A30 million ($67.75 million) spent on imports of 9,952,000 bbl of refined products, total petroleum imports last year ranked higher in Australia's imports bill (excluding freight) of £A797 million ($1.793 million) than any other group of commodities except metals and machinery.

At several Australian ports crude oil and petroleum products account for a higher proportion of total inward and outward freight than any other group of items.

Australian refineries' output does not match local demand for each individual product, and imports are required to meet deficiencies while exports dispose of surpluses.

Imports come mainly from Indonesia and the Middle East. Main items, in order of importance, are motor and aviation gasoline, power and lighting kerosine, lubricants and solvents.

Heavy oils and automotive diesel oil account for the great bulk of exports, which go mainly to New Zealand, Malaya, Singapore, Aden and the islands of the south Pacific. These exports, now totaling about 7,143,000 bbl/yr contribute approximately £A16 million ($36 million) a year to Australia's total export earnings, which over the last five years have averaged £A822 million ($1.849 million) a year.

Australia's oil refining industry enjoys a measure of tariff protection, customs duty on all petroleum products being higher than excise duty which, in the case of products other than fuels used for transport purposes, is not applied at all at present. The protection amounts to an average of 1-penny (1¢) per gallon over all dutiable products, which is the actual protection rate for gasoline. Protection rates are reviewed every two or three years by the Tariff Board, an Australian Government agency.

Extensive marketing network. The marketing and distribution of petroleum products, capital expenditure on which now stands at more than £A150 million ($337 million) has contributed greatly to the opening up of the Australian hinterland over the last 60 years, and it is still doing so.

With about 700 metropolitan and country depots, 90 large ocean terminals and 20,000 gas stations spread throughout the country, marketing is good. Important customers are shipowners for whom bunker facilities have been provided at 20 Australian ports, one of which—Fremantle, Western Australia—has a very large bunkering business by world standards.

Most service stations in Australia are owned by individual proprietors, although the number owned by oil marketing companies has increased in recent years following the introduction in 1951-52 of the "solo brand" system.

The market is shared by ten companies: two subsidiaries of the Royal Dutch/Shell group, two of the Standard-Vacuum group, one of each of the British Petroleum, California-Texas and Compagnie Francaise des Petroles groups, and three Australian-owned companies. No other companies market petroleum fuels, but a few smaller ones, notably the British-owned C. C. Wakefield Co., have a share of the lubricants market.

Of "the ten" only six have an Australian-wide distribution network, and two of the other four—one Australian company and the Compagnie Francaise des Petroles subsidiary (Total Oil Products [Australia] Ltd.)—confine their marketing activities to the southeast corner of Australia.

The capital city price of premium-grade gasoline in Australia is 3/9-½ (42¢) per gallon.

Petrochemical industry. Australia is not as far advanced in the field of petrochemical manufacture as Britain, France, Italy or the Netherlands, but is now embarking on the rapid development of this industry.

Thirteen petrochemical plants are either completed, under construction or planned, at total cost of nearly £A50 million ($112 million). These have already begun to play an important part in the Australian economy.

Australia's oil industry now employs directly 31,000 people and indirectly many thousands more. Its widely ramified operations involve an annual outlay, exclusive of capital expenditure, of more than £A350 million ($787 million). About £A60 million ($135 million) of this figure represents customs and excise duties on petroleum products, and other major items are payment for imports of crude oil and refined products, and refining and transport costs.

Oil will play an increasingly important role in Australia's future, with so much still to be done in developing the nation's natural resources, extending and improving transport and communications systems and expanding secondary industries and public utilities.

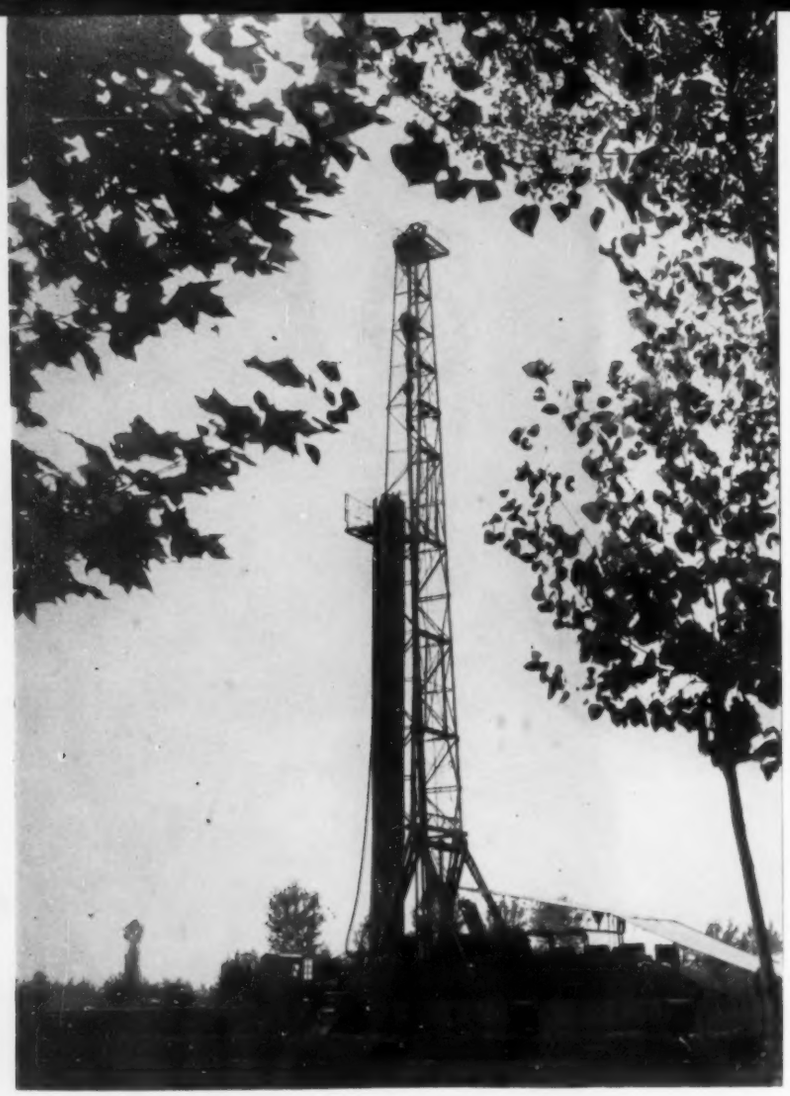
The industry's marketing and refining branches are now firmly established and operate efficiently. But while solid foundations are being laid for its new, petrochemical-manufacturing branch, the greatest contribution the industry could make to Australia's economic welfare—discovery and exploitation of prolific local oilfields—is not yet in sight. So far £A63 million ($142 million) has been spent on the quest for oil in Australia and its territories, and with exploration efforts being intensified, Australians are hopeful that success may not be far off. END

A refinery is born

The first stirrings on the site of a refinery-to-be. The scene here is in Belfast, but it is typical of many other sites—in Europe, Africa (North, South, East and West) and the Middle East.

In sixteen widely separated places refineries are being planned or built or are undergoing major expansion by BP and its associates... tangible symbols of progress with British Petroleum.

BP



Europe's indigeneous production is growing rapidly, both of crude and natural gas. Shown is an AGIP rig drilling in the Po Valley

Europe's energy supply — as seen by OEEC

World reserves of crude petroleum appear sufficient to meet all foreseeable demand increases, in a new study. Investment in oil facilities in Europe will remain high

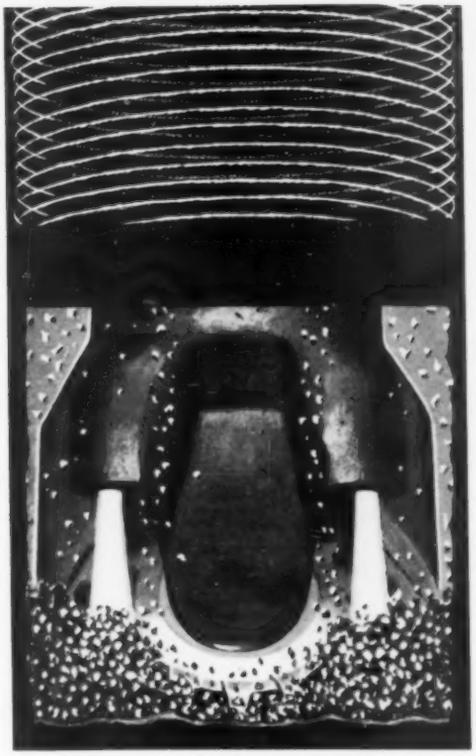
THE LAST GENERAL REPORT on Europe's oil economy of the Organization for European Economic Cooperation — "Oil — The Outlook for Europe," published September 1956 —covered developments to end 1955 and looked forward at possible development to 1975. It was preceded (May 1956) by the Commission for Energy's report—*"Europe's growing needs of energy—How can they be met?"*—which had been concerned, under Sir Harold Hartley, with the problems raised by shortage of energy supplies that had persisted in Europe since the end of the war and with the cost and security difficulties that might arise in the future from Europe's growing dependence on imported fuel.

The Suez crisis, which occurred very soon after publication of the above-mentioned last general report and which was the subject of a special report—*"Europe's need for oil,"* underlined the Hartley Commission's fear about the security of overseas oil supplies. As a result on the one hand of circumstances which included a mild winter and a slowing down of the development of industrial production and hence in energy demand, and on the other of effective emergency planning by OEEC and the oil industry, the effects of the Suez crisis on OEEC area economy were less serious than might have been expected. This sharp reminder, however, served to encourage such measures as the further diversification of overseas supply sources and stockbuilding within the OEEC area as an insurance against a similar future emergency.

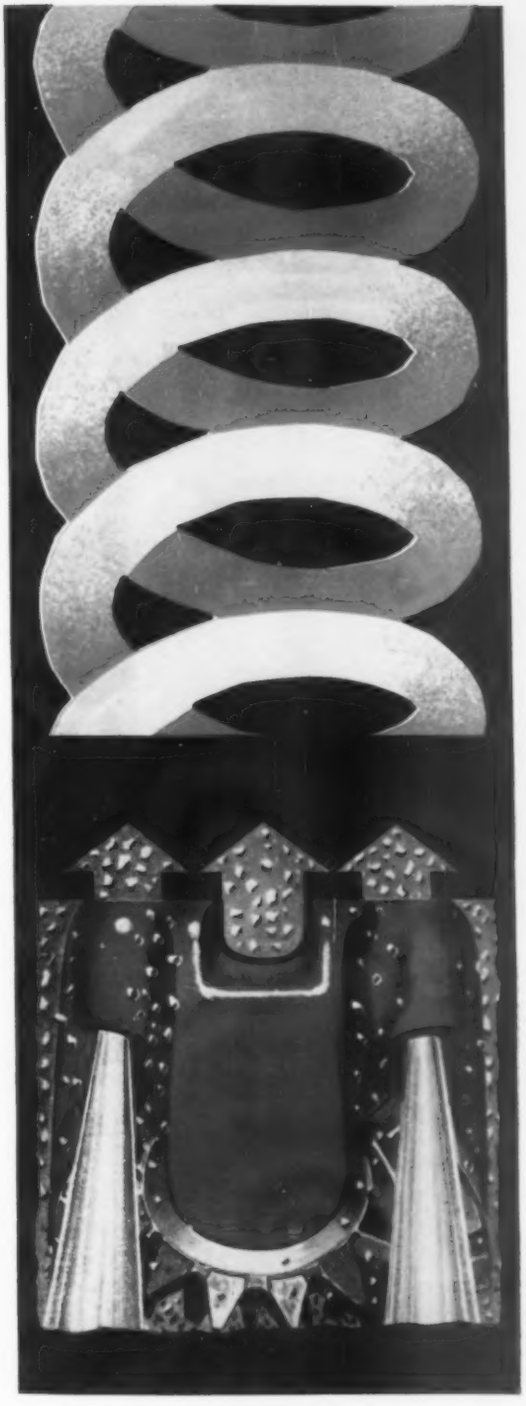
The prospect of a similar emergency receded in the following years due to a radical change in the overall energy situation. The strong increase in industrial activity characteristic of 1955 was checked from 1956 to 1958 and during these years there was virtually no change in Europe's total energy demand, although oil consumption alone and its relative importance in European economy continued to increase. This trend had begun many years earlier. In 1955 oil supplied 21% of Europe's energy requirements; by 1959 this had risen to 30%. Further, by 1959, when European consumption was running at an annual rate of over 150 million metric tons (1,050 million barrels), 20% of total free world consumption was in Europe against 17% in 1955.

But when economic expansion was resumed in Europe in 1959 there was an abundance of energy supplies and greater freedom of choice for consumers than at any time since the war. Buyers, not sellers, were now dominant.

It was in this atmosphere that the OEEC Energy Advisory Commission under Prof. Austin Robinson reviewed the future prospects in the light of developments since the Hartley report of 1956, recognizing in its title—*"Towards a new energy pattern in Europe"*—the changing energy situation the second postwar decade had brought. The main conclusions of this report were summarized in WORLD PETROLEUM of April 1960. The implications of this Robinson report are still being considered within OEEC but meanwhile the Oil Committee felt that



milling or drilling?



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PERCENTAGE SHARE IN OEEC AREA TOTAL CONSUMPTION

	Gasolines	Kerosines	Gas/diesel	Fuel oil	Others
1959	18.7	3.7	22.6	45.2	9.8
1958	19.4	3.7	23.7	43.6	9.6
1957	20.2	3.9	23.8	42.5	9.6
1956	20.2	4.1	23.5	42.3	9.9
1955	21.7	4.3	23.2	40.5	10.3

OEEC AREA CONSUMPTION OF PETROLEUM PRODUCTS (a)

Million Barrels

	1959	1958	1957	1956	1955
Inland consumption	950.6	843.5	716.1	704.9	609.0
Maritime bunkers	102.9	96.6	86.8	102.2	93.1
Total	1,053.5	940.1	802.9	807.1	702.1

(a) Excludes Spain, whose inland consumption was 31.5 million barrels in 1959.

changes in European oil affairs, including the repercussions of developments over a wider area, were of sufficient importance to justify a further report devoted to oil alone.

This 140-page report, published in March —*"Oil: Recent developments in the OEEC area"*—is summarized as to its main conclusions in this article. Its three chapters are entitled: I. Introduction, Summary and Conclusions; II. The growing importance of oil; and III. How Europe's needs are met. In addition some 40 pages are devoted to individual country studies and there is an appendix of statistics and graphs and a large map of oil refineries and pipelines in the OEEC area.

A summary follows of the main conclusions of the OEEC Oil Committee:

Demand and Supply — Past: Although total energy demand since 1956 has been relatively unchanged, oil demand in Europe rose from 100 million metric tons (700 million barrels) in 1955 to 150 million metric tons (1,050 million barrels) in 1959, and the share of oil from 21% to 30%.

Within this 50% total increase in consumption for inland use and bunkers, the inland use of gasoline and kerosine increased nearly 30% and that of gas/diesel and fuel oils over 50% and 85% respectively. The more rapid growth of heavier oils led to an increase in the net imports of these products. Gas/diesel and fuel oil bunkers showed little change.

Potential capacity for oil production and transport has increased more rapidly than demand as a result of: (a) marked expansion of established oilfields, development of new resources, entry of a far greater number of companies into international oil trade, and increased tanker availability; and (b) temporary slackening of US and West European demand in 1957-58 combined with restrictions in the US and elsewhere on oil imports.

Demand and Supply — Future: West European demand is forecast as increasing to between 200 and 240 million metric tons (1,400 and 1,680 million barrels) in 1965, and to between 300 and 390 million metric tons (2,100 and 2,730 million barrels) in 1975. Within these totals, light product consumption is likely to maintain its steady rate of increase, whilst the use of heavy oils will continue to expand rapidly, although perhaps at not so fast a rate as in recent years.

On the present evidence of proven reserves and the likely level of "ultimate recovery," there is no doubt that world oil reserves are sufficient to meet all foreseeable demands.

Whilst the tonnage of supplies drawn by Europe from the Middle East and Venezuela will increase, their share in total supplies is likely to fall as those from North Africa, and possibly Russia, increase. The extent taken from the latter will depend on the manner supplies compete with established exporting areas and possibly also on governmental policies.

Natural Gas: There have been important developments in European natural gas developments, but interest is now mainly concerned on future imports, particularly from the Sahara. Much exploratory work is being carried out on production, transport and marketing, but it is too early to assess the ultimate significance of this development for the European energy market as a whole.

Trends in Oil Operations: European refinery capacity has increased from about 53 million metric tons (1.06 million b/d) since 1955 and was some 180 million metric tons (3.60 million b/d) at end-1959. The end-1960 figure is forecast at 4.51 million b/d. Within two years 16 of the 18 OEEC member countries are likely to possess their own refinery capacity, although a considerable intra-European trade in refined products is likely to continue to meet variations in individual market requirements. Individual refinery size is increasing, and with the growth in consumption it is becoming economic in many cases to site refineries at inland centers supplied with crude by trunk pipelines from the coast.

European demand is now such as to make trunk lines an economic proposition, and a number of new developments are in hand. These will lead to changes in the existing pattern of oil transportation, and other forms of transport will be affected, although this should be offset to some extent by the overall growth in European consumption.

The world tanker fleet has increased more rapidly (by 50% between 1955 and 1959) than the increase in volume of seaborne oil, due mainly to excessive ordering in 1956 and 1957. In consequence new orders have been falling and delivery dates extended. With the present construction rate, the likely reduced length of haul, e.g., from North Africa, and growing efficiency in use, demand is unlikely to match capacity for some time.

Investment in oil facilities in Europe (including indigenous production) should continue at a high rate, estimated as of the order of $20,000 million over the period of 1955-1975. There will in addition be substantial investment outside Europe for the production and transport of its additional oil import requirements. Whilst a substantial part of the capital for this development will continue to be found from the industry's earnings more money is being raised on the market than has been the case hitherto.

The Consumer and Public Policy: Demand and supply imbalance has led to reduced prices and a very competitive market situation. In the European market competition has been particularly marked in heavy oils and where a number of competing refiners and distributors have had access to low priced crude and products, including USSR imports.

Many fuel producers are facing difficulties due to the changed energy situation, but consumers have benefited from being able to exercise a choice between competing fuels, and from the improved supply security that has accompanied the growth in oil production and transport capacity and the greater diversification of sources.

The attitude of member countries to the changed circumstances will vary according to the effects that growing oil imports are having on the comparative strength of their indigenous fuel industries and their economics generally; there may also be differences of view between governments and their consumers. Oil exporting countries are concerned at the fall in oil prices and some have joined together with the object of protecting their oil revenues.

In the long term all governments, whether of oil consuming or producing countries, have close identity of interest in unimpeded oil flow because of its direct bearing on their future economic well-being. While

(*Continued on page 70*)

OEEC AREA PRIMARY ENERGY CONSUMPTION PATTERN (a)

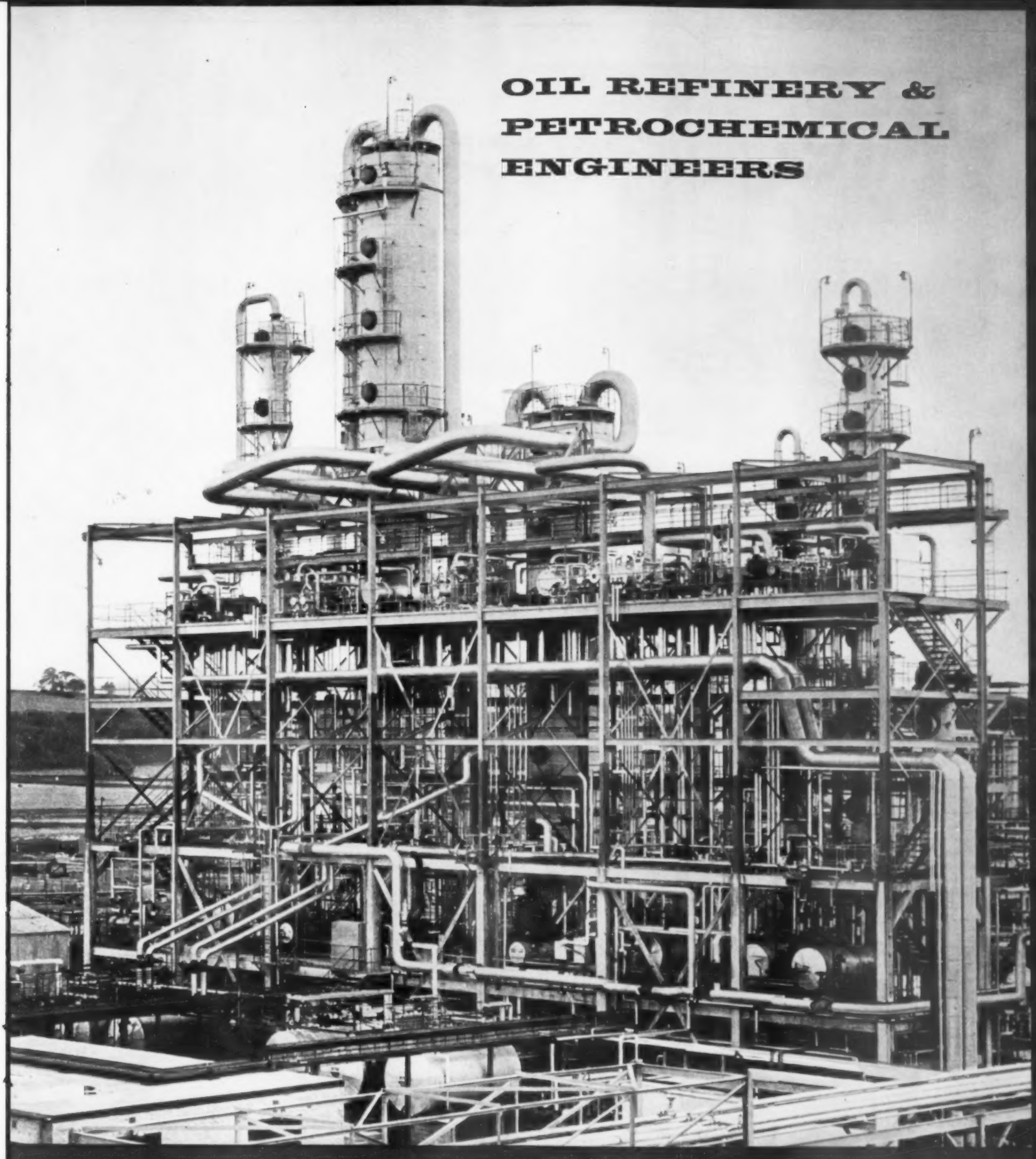
	Solid fuels	Petroleum fuels	Natural gas	Hydro-electricity
	Percentage			
1959	64	30	2	4
1958	69	26	1	4
1957	74	22	1	3
1956	74	22	1	3
1955	75	21	1	3

(a) Excluding Spain

OEEC AREA CONSUMPTION OF MAIN PRODUCTS

Million barrels

	Gasolines	Kerosines	Gas/diesel oils — Inland	Gas/diesel oils — Bunkers	Gas/diesel oils — Total	Fuel oil — Inland	Fuel oil — Bunkers	Fuel oil — Total
Excluding Spain:								
1959	196.7	39.2	213.5	24.5	238.0	401.1	74.9	476.0
1958	182.0	35.0	198.8	23.8	222.6	340.2	70.0	410.2
1957	162.4	31.5	168.0	23.1	191.1	276.5	65.1	341.6
1956	163.1	32.9	163.8	25.9	189.7	267.4	74.2	341.6
1955	152.6	30.1	140.0	23.1	163.1	217.0	67.2	284.2
Including Spain:								
1959	202.3	42.0	220.5	25.2	245.7	416.5	74.9	491.4



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by William C. Uhl
Processing Editor

Highlights of the month—a new low-cost solvent extraction process for separating isobutylenes from other olefins, and a new butane isomerization process for upgrading light hydrocarbons to motor fuel blending stocks of high quality

A new low-cost solvent extraction process useful for C_4 olefin processing, and developed in France, has now reached the commercial application stage.

Said to offer particular advantages in the production of high-purity isobutylene or the removal of isobutylene from other olefins, the process was discovered by Cie. Francaise de Raffinage. It is now available through sublicense by Badger Mfg. Co. through CFR. Badger and its European affiliates have been working actively with CFR since 1959 in the engineering of the process to commercial-scale operation.

The process scheme, illustrated in Fig. 1, calls for contacting feedstock and a solvent (the nature of which is not disclosed), phase separation, stripping of the solvent and redistillation of isobutylene.

As shown in the diagram, raw feed is mixed with solvent in two reactors where isobutylene is extracted preferentially. The reaction takes place under pressure, usually in two stages, as a counter-current liquid phase extraction. Extract, containing the chemically combined isobutylene, is flashed to atmospheric pressure and fed to the regenerator. Solvent is separated directly in a stripper; the isobutylene gas is scrubbed, compressed, and purified before going to storage as 99%+ product.

The raffinate C_4's, after phase separation, are washed and sent to storage as specification LPGas, or they move to by-product separation units. The polymer is separated and flows to the gasoline pool or other uses. Regenerated extraction solvent is recovered as bottoms from the stripping tower, cooled, and recycled to the reactors.

Because there is no butane contamination of product, further fractionation is not required. Steps requiring reconcentration or repurification of the solvent are also eliminated. Without the distillation and purification steps, both original investment and operating costs are reduced substantially.

Full scale pilot plant tests have been carried out by CFR to demonstrate the process. Its value has been shown by the following:

(1) Minimum losses to polymer formation.

(2) High yields of exceptionally pure isobutylene product are routine.

(3) Raffinate with very low isobutylene content can be attained if desired.

(4) Feeds high in butadiene are readily processed.

In a test run with feeds containing 35% butadiene: isobutylene product purity was 99.4% and yield was 86%; butadiene recovery in the raffinate was 98%; isobutylene remaining in the reffinate was under 2.5%; raffinate met specifications for LPG concerning residue of evaporation (without redistillation); and the solvent remained clear and unaffected.

The process is also advantageously suited for the production of isobutylene-free C_4 hydrocarbons such as butane, isobutane, butene 1, butene 2 and butadiene for use in polymerization, condensation, alkylation, oxo, and other reactions involving these products. Some typical end products using these C_4 intermediates include: polyisobutylene, butyl rubber, di-isobutylene, oxo alcohols, isoprene, polyisoprene, neoprene rubber, butadiene, polybutadiene, butadiene copolymers, hexamethlylenediamine, sec. butanol, diethyl ketone, dodecene, ethylene-butylen copolymer, and butadiene latex.

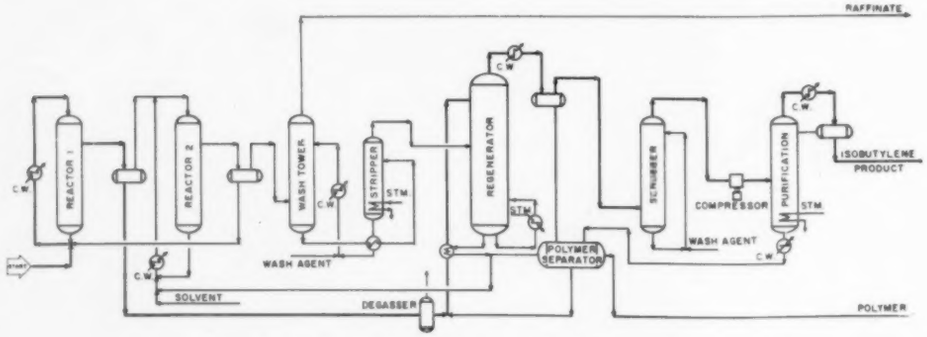


Fig. 1—Process diagram for new isobutylene process.

Another new butane isomerization process to upgrade light hydrocarbon fractions to high performance gasoline range blending stocks has been developed. Called "Butomerate," it has been developed by Pure Oil Co. as a companion technique to the company's "Isomerate" process for pentane-hexane.

The new process is centered around a newly developed solid catalyst which has high isomerization activity at low temperatures. Normal butane is selectively isomerized at near equilibrium yields, and most efficient operation is in the 300-500 F range.

Details of the catalyst were not revealed, but Pure described it is a specially formulated and activated composition containing a small amount of non-noble hydrogenation metal on a high surface area support. Its cost is much less than isomerization catalysts built around noble metals.

In bench-scale tests with n-butane containing about 1% of the isomer, isobutane concentrations of 60% or more are obtained at temperatures as low as 250 F. And it was found that the catalyst operates either at atmospheric or elevated pressures and in the presence or absence of recycle hydrogen. However, side reactions tend to occur at atmospheric pressure as equilibrium is approached. Therefore in commercial applications the use of hydrogen and higher than atmospheric pressures are being recommended.

Butomerate is a relatively simple process. Dried n-butane picks up hydrogen (fresh and recycle), is heated and sent through the reactor. Hydrogen is removed from reactor effluent, and the products stream goes through a stabilizer and a deisobutanizer, producing first, fuel gas, and secondly, isobutane, pentane, and n-butane (which is recycled to feed).

The ratios of hydrogen to n-butane are much lower than those using in the Isomerate process, although hydrogen recycle is used. This is an important factor in minimizing the size of the reactor, compressors, and some recovery units.

Furthermore, since isobutane yields are inversely proportional to hydrogen recycle rates, it is important to maintain hydrogen-butane ratios as low as possible, compatible with reduced side reactions and no catalyst fouling under process conditions.

The Butomerate unit could be installed adjacent to an alkylation unit, in which case common stabilizers and fractionators can be used.

This arrangement could be attractive in cases where a refiner was considering addition of alkylation but had a shortage of isobutane in relation to olefins.

In this type of scheme, n-butane from the common debutanizer tower, or from an external source, along with hydrogen—or cat reformer tail gas—flows to the Butomerate reactor. Hydrocarbon product from the separators, containing 55 to 60% isobutane, is fed to a common deisobutanizer tower. The isobutane from the Butomerate unit and the alkylation reactor recycle pass overhead, and are depropanized before being fed to the alkylation unit contactor.

The amount of propane and lighter produced in the Butomerate unit is low, therefore the size of the depropanizer will be only slightly affected by including these gases. The small quantity of pentanes produced by the isomeration is withdrawn from the debutanizer with the alkylate, and because this is largely isopentane it goes directly to fuel blending with the alkylate.

Studies of catalyst life indicate it will perform indefinitely, Pure said. Tests were on a pipeline n-butane charge containing about 2% isobutane for 1,000 hours at 440 F. Space velocities, pressure, and hydrogen ratios were adjusted to give an isobutane yield of about 55% per pass.

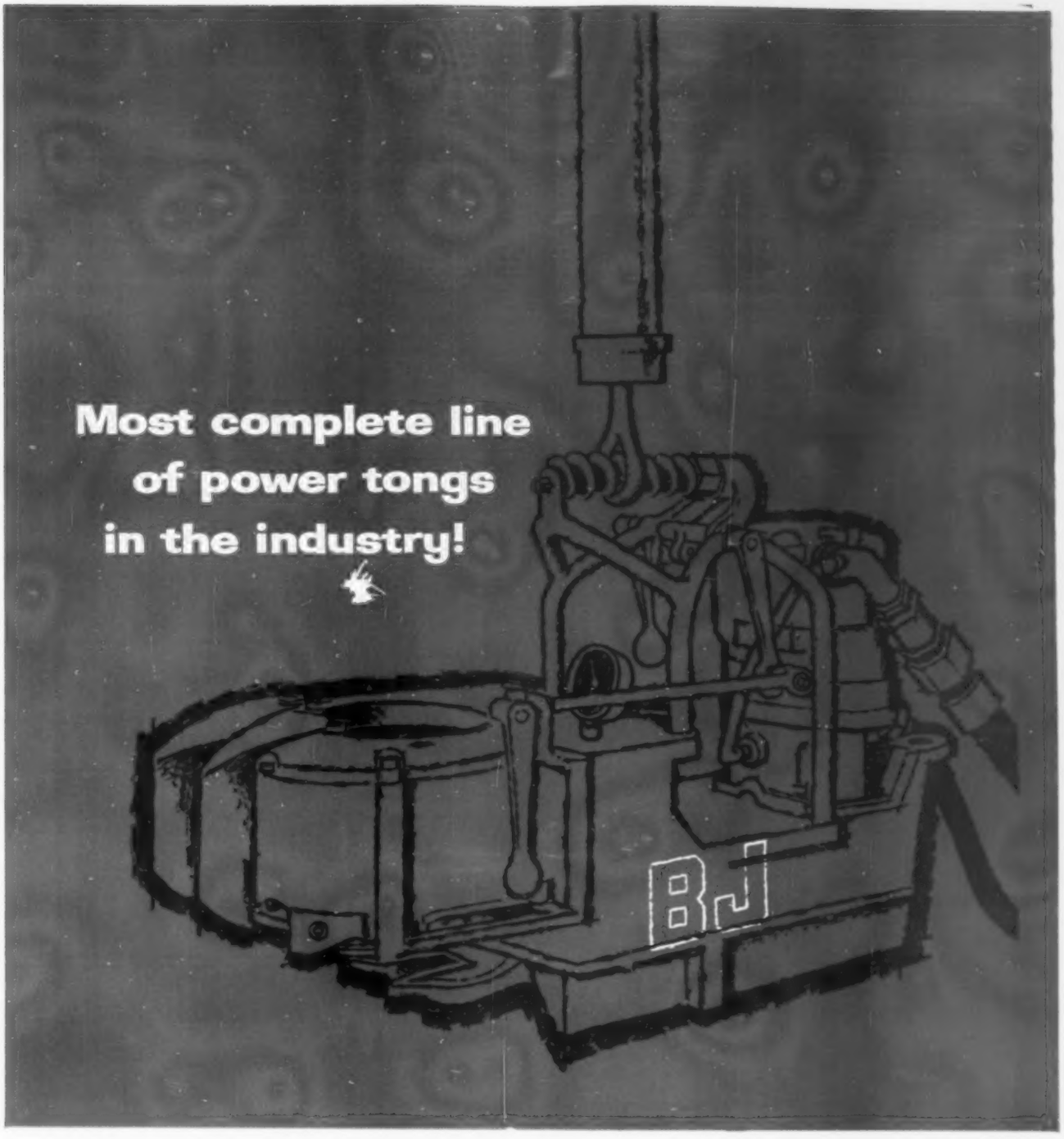
The catalyst is sensitive to large amounts of water and sulfur. Data have not yet been established as to the maximum sulfur concentration which can be tolerated without loss in yield. The sulfur content of the butane used in the catalyst life tests was about 8 ppm, and no poisoning effects were observed.

What's New in Processing Plants

Planned—a $1.6 million natural gas processing plant, to handle 70 mmcf/d of gas, and with LPG extraction facilities (45,740 gal/day commercial propane and 16,240 gal/day butane), in the Edmonton, Alberta, Canada, area, by Steelman Gas (Alberta) Ltd., for completion by September 1962.

• • •

(Continued on page 56)



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BJ
QUALITY COSTS LESS IN THE LONG RUN

(*Continued from page 54*)

Contract awarded—to Kellogg International Corp. by Gulf Oil Corp., for its 30,000 b/sd refinery at Stigsnaes, Denmark, to be completed end-1962. Main units include atmospheric and vacuum stills, naphtha desulfurization-reforming, visbreaking, and two desulfurization units for fuel oils. A marine jetty to be built offshore from the refinery in Agerso Sound will be capable of handling tankers up to 50,000-dwt.

• • •

Under construction—a 10,000 b/d increase in crude capacity, by means of a new combined distillation and coker unit, at Gewerkschaaft Erdoel-Raffinerie Emsland's 50,000 b/d refinery at Lingen-Holthausen, West Germany, with completion fall of 1962.

• • •

Planned—a second refinery, near Stuttgart, (Wuerttemberg), West Germany, by Suedpetrol A.G., who now expect to complete a 40,000 b/d refinery at Ingolstadt late in 1963. Ownership of Suedpetrol by Ente Nazionale Idrocarburi, of Italy, has been increased to 74% from previous 50%. German banking interests now hold 26%, down from previous 50%.

• • •

Rejected again—Petroleos de Galicia's plan for new refinery at Vigo, Spain, by Spanish government; the second time in two years. Reasons cited: company "didn't prove its continuous and economical access to crude supply sources and couldn't sufficiently guarantee the marketing of its production, locally or abroad."

• • •

Under consideration—a new refinery in West Germany, possibly at Gernsheim, between Darmstadt and Worms, by Standard of Indiana.

• • •

Agreement signed—by Soviet Union with India, for three-stage completion of Indian government refinery now under construction at Barauni, in Bihar. Plan is for completion of 20,000 b/d capacity by December, 1962, to be increased to 30,000 b/d by Arpil, 1963, and a lube plant by end-1963. Contract is valued at $30 million.

• • •

Planned—a $700,000 lube oil blending plant, at Sydney, New South Wales, Australia, by BP Australia Ltd., to operate eventually on BP's new $17 million lube oil manufacturing facilities now abuilding at Kwinana.

• • •

Completed—Shell Oil's new 20,000 b/d refinery on Pulau Bukom, Singapore, at end of June.

• • •

Contract awarded—to Selas Corp. of America, by Tidewater Oil Co., for "world's largest" high pressure catalytic steam reforming furnaces, to manufacture hydrogen (50 mmcf/d) from refinery and natural gas, at Avon, California, as part of new $20 million Isocracking unit being built for Tidewater by Bechtel Corp.

• • •

Completed—by BP Group refineries in France and Germany: (1) expansion at Dunkirk, France, from 2.3 to 2.9 million ton/yr, and (2) new Edleanu dewaxing unit at Neuhof lubricants plant of BP's associate, Oelwerke Julius Schindler GmbH, with capacity of 2,000 b/sd.

• • •

Planned—a 650 mmcf/d gas processing plant near Yscloskey, La. (liquid products about 10,000 b/d), for completion May, 1962, by Shell Oil Co. and six other participants: California Co., Cities Service Production Co., Humble, Continental, Atlantic, and Tidewater.

• • •

Planned—a new 70,000 b/d crude distillation unit, at Sugar Creek, Mo., by American Oil Co., for completion by July 1, 1962, to replace four old stills, and adding 50% to asphalt output, raising it to about 4,000 b/d. Ralph M. Parsons Co. has engineering and construction contract.

• • •

Approval given—by federal government of Rhodesia, for projected 20,000 b/d refinery at Salisbury, to be built by American Independent Oil Co. (20% interest) and other established marketers in the area (80%), including Shell, Stanvac, Caltex, British Petroleum, and Cie. Francaise des Petroles. Expected cost is $36 million, and completion is about 1964.

• • •

Planned—a 1,000 b/d topping plant at Elath, on Gulf of Aqaba, Israel, by Sonol Israel, at cost of $700,000, with completion anticipated mid-1962. Company is a Haifa-based importer and distributor, associated with Sonneborn Associates Petroleum of New York.

• • •

Completed—a 2,700 b/d Unifiner-Platformer, at St. Boniface, Manitoba, by North Star Oil Ltd.

• • •

Plans confirmed—by Shell Oil of Canada, for building a refinery at Bronte, near Toronto, Ont., for completion in 1963, with design capacity of 31,000 b/sd and to include catalytic cracking, catalytic reforming, and hydrodesulfurization as well as crude distillation and flashing. Rumored and denied several times in the five years since Shell acquired the 750-acre site, the project was formally announced early this month by Shell of Canada's President W. M. V. Ash.

What's New in Petrochemicals

Site selected—for Dow Chemical's projected Spanish petrochemical complex, at Somorrostro, port city near Bilbao, with completion expected in 1963.

• • •

Planned—an aromatics plant at Dinslaken, West Germany 14,000 ton/yr of high purity paraxylene, using a California Research Corp. process), by a newly formed partnership between BP Benzin and Petroleum AG and California Chemical GmbH, to be known by the short designation Deutsch BP und California, to operate on feedstock from adjoining BP Ruhr refinery, for completion in mid-1962. Lurgi has the contract. The project parallels a similar venture at Kent, England, by Standard Oil of California and British Petroleum. The two projects involve $20 million.

• • •

Contract awarded—to Badger Ltd. of London, for engineering and construction of a 15,000 ton/yr phthalic anhydride plant at Hull, Yorkshire, England, by Grange Chemical Ltd., for completion second half of 1962. Originally it was thought this plant would be at Grangemouth, as reported in WORLD PETROLEUM, June.

• • •

Applications filed—with Indian government, by four Calcutta companies who are competing for license to manufacture furnace type carbon black (present demand of 13,000 ton/yr is expected to rise to 30,000 ton/yr by 1965-66):

(1) Kanoria General Dealers (with Phillips Petroleum) for an 8,000 ton/yr plant near Bombay.

(2) Davenport Co. for a 7,200 ton/yr plant at the government refinery under construction at Barauni.

(3) B. K. Jayan for a 10,800 ton/yr unit in Gujarat state, in which it seeks association with Vitro International.

(4) Manjushree Industries, associated with Huber Corp., for a 16,500 ton/yr plant in Bombay.

In addition, Voltas Ltd., now a distributor for Columbian Carbon, also seeks to build a plant, with an Indian partner and dollar capital participation. And, Godfrey L. Cabot Co. and Kasturbhai Lalbhai, a Bombay textile man, are expected to revive a long-standing proposal.

• • •

Contract awarded—to Scientific Design Co. Inc., by Mo och Domsjo AB, to design and engineer Sweden's first direct air oxidation ethylene oxide plant, a 33 million lb/yr facility at Stenungsrund. The company will also build an ethylene glycol plant designed by Scientific Design.

• • •

Contract awarded—to Catalytic Construction of Canada Ltd., by Polymer Corp., for engineering, procurement and construction of a "multi-million dollar" polybutadiene plant at Sarnia, for completion before end-1962. Estimated output 20,000 ton/yr.

• • •

Agreement reached—by Petroleos Mexicanos and du Pont, to start construction late this year on an $8 million tetraethyl lead plant at Tampico, Mexico. Pemex will own 51%, du Pont 49%.

• • •

Contract awarded—to Badger Mfg. Co., by Union Carbide Chemicals Co., for a 50 million lb/yr phthalic anhydride plant (fluid-bed process) at Institute, W. Va., for completion latter part of 1962.

• • •

Expansion planned—by Socony Mobil Oil Co., through its British subsidiary, Mobil Holdings Ltd., with offer to purchase for $18.7 million the holdings of O. & M. Kleemann Ltd., a UK plastics manufacturer. The transaction is subject to approval by the British Treasury.

Completed—a 350 b/d Hydeal unit (UOP designed and licensed) at Sarnia, Ontario, by Canadian Oil Cos. Ltd., to produce nitration-grade benzene from toluene, the first such unit in Canada.

• • •

Complete—a 7,000 b/d Udex unit at British American, Montreal, Quebec, refinery, benzene from which will go to B.A.-Shawinigan, for manufacture of cumene.

Ethyl Announces New Compound

The Ethyl Corp. has announced availability of development quantities of its "Ethyl" Ferrocene, which is dicyclopentadienyl iron.

The compound is finding growing applications as a combustion control additive, as a high temperature lubricant, as an intermediate for thermally stable polymers, and for radiation-resistant polymers, and also as an ultraviolet absorber.

Discovered in 1951, the material has led to broad new research and development work in the whole field of organometallics. It is a so-called "sandwich" compound in which an iron atom is sandwiched between two cyclopentadienyl rings lying in parallel planes.

Reactions of ferrocene, according to Ethyl, are in many ways similar to the aromatics. Its ease of oxidation is the greatest difference between it and the aromatic compounds. It has a low order of toxicity and is thermally stable; it is highly soluble in hydrocarbons and insoluble in water.

Being produced at Ethyl's Orangeburg, S. C. plant, it is available at a price of $10 per pound at present.

Gasoline Ratings Up in Europe

Motor gasoline octane ratings are continuing upward, as indicated by the latest survey by The Associated Ethyl Co. Ltd. As shown in the table below, which compares research octane numbers at the beginning of 1961 to those in 1960, the ratings on premium grade has gone up particularly in Switzerland and Austria, and on regular grade in Norway, France, and Switzerland.

	Premium		Regular	
	1960	1961	1960	1961
Austria	93-97	95-98	82-87	84-86
Belgium	94-97	94-97	85-88	85-88
Denmark	95-97	95-97	83-86	83-87
Finland	94-95	94-95	87-88	87-88
France	92-94	93-95	82-85	85-87
Germany (West)	97-101	98-101	88-92	90-93
Great Britain	95-101	95-101	82-86	83-84
Italy	98-100	98-100	84-86	84-87
Netherlands	93-95	94-95	84-86	84-88
Norway	93-95	93-97	79-84	83-90
Spain	93	92-94	82-83	82-84
Sweden	96-98	96-98	88-90	87-90
Switzerland	94-100	98-100	87-91	90-92

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You may save equipment costs, since AO-22 sweetening requires little more than a modification of existing equipment.

You may save on additional chemicals and on regeneration expenses—and you don't lose any gasoline or octane numbers in the process.

You also eliminate the chance of contamination by sulfur or copper, because sweetening with AO-22 does not require their use.

Stabilizing, too. And, finally, you combine sweetening *and* stabilizing at one time. Du Pont AO-22 retards gum formation and protects the quality of your gasoline in storage. You can add these advantages to your processing wherever your refinery is located, because AO-22 is distributed worldwide by Du Pont.

FOR FURTHER FACTS, we suggest you contact your Du Pont representative or write to: E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Del.

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BITS • DRILL COLLARS
REAMERS • TOOL JOINTS

New Austrian Refinery Now Onstream at Schwechat

(Continued from page 39)

VOEST (tanks, vessels, steel construction), Simmering-Graz-Pauker (boilers, coolers), Gebr. Boehler (heat exchangers), and Brown-Boveri, Elin Union, Siemens-Schuckert, and Siemens-Halske (electric installations).

The heart of the new refinery is the 36,000 b/d atmospheric crude distillation unit. The column has an overall height of 161.75 ft, a diameter of 16.4 ft, and a daily throughput capacity of 211,860 cubic feet. It weighs 11.5 metric tons and is made of 0.702-inch-thick steel plates with enough protection against corrosion so that both Austrian "sweet" crude and imported "sour" crudes may be processed. The design feature of the unit provides for great flexibility in operation and permits the processing of all kinds of crude.

For the time being, the charge stock will be Austrian asphaltic, paraffinic, and mixed-base crude, and imported crudes from the Soviet Union. Austrian crude is run to the refinery through pipelines. To facilitate the transport of the Austrian crude across the Danube River and of refinery products across the Danube to the Lobau storage tanks, an 853-ft pipeline bridge for 13 pipelines was built. Soviet crude is transported in barges on the Danube.

The crude charge is fractionated into white products in total, kerosine, gas oil, top spindle oil, and fuel oil. After intermediate storage, the white products are split into gasoline, low boiling naphtha, and heavy naphtha. Naphthenic acid is extracted from kerosine and from gas oil by sodium hydroxide treatment. Gasoline, kerosine, and gas oil is pumped across the Danube to the Lobau storage tanks, while top spindle oil and fuel oil are stored on the refinery site. Fuel oil will be either marketed without further treatment or subjected to a vacuum distillation to obtain a light fraction, which together with fractions from the atmospheric unit will be fed to a catalytic cracking plant that is yet to be built. Once the catalytic cracking plant has been added, the refinery will be able to turn out—in combination with the Platformer and the old Schwechat refinery's thermal cracking plant—9,000 b/d of gasoline in the ratio 4,000 b/d of regular to 5,000 b/d of premium.

To date, Austria has been unable to produce high-octane gasoline in its existing plants. Now, the Schwechat refinery will produce it in the 5,000-b/d UOP/Unifiner and Platformer. The charge, low boiling and heavy naphtha, will first be purified in the Unifiner. This will be done in the unit's reactor at a temperature of 680 F and a pressure of 853.3 psi in the presence of hydrogen and a cobalt molybdenum catalyst. The Platformer charge is then heated together with compressed hydrogen to a temperature of 986 F and sent at a pressure of 568.9 psi over the platinum catalyst in the Platformer's three reactors.

Refinery gas from the distillation, reforming, and cracking unit is processed in a 30 metric ton/hour plant into LPGas, propane, and butane. LPGas and residual gas are then desulfurized, residual gas goes to the refinery fuel gas system.

In mid-1959, the asphalt plant was put into operation as the refinery's first unit. It consists of two vacuum distillation columns with a capacity of 1,050 b/d each, and is fed naphthene-base residues from Matzen crude. The charge is subjected only to vacuum distillation, thereby giving the end product special characteristics which lead themselves excellently for bitumen emulsions. The products are stored in two 105,930-cubic-feet, one 35,310-cubic-feet, and four 7,062-cubic-feet tanks.

Electric current (6-kV, 500-V, and 220-V), compressed air, cooling water, and fuel gas is supplied by the power house. The steam, produced in three boilers outfitted with combined gas and fuel oil burners, drives three 8,500 kW condensing turbines at a pressure of 1,194.7 psi. Two boilers have been laid out for a steam production of 92.5 metric tons/hour (maximum), and one boiler for 76.0 metric tons/hour (maximum). A 6,500-kW emergency electric generator operates independent of the steam supply. It has a gas turbine driven either by natural gas or heavy Diesel fuel. There is electric drive throughout the refinery.

Instrument and plant air is produced in three two-stage helical gear compressors at a rate of 97,809 cubic feet/hour (maximum); the pressure is 113.8 psi. Water is supplied by five wells. Only a small amount of the water is used directly; the bulk, about 28,248 cubic feet per hour, is first treated. The nine-cell cooling tower operates with fans and has been designed for a capacity of 264,825 cubic feet per hour.

The crude stock of the refinery is stored in eight tanks with a total capacity of 4,731,540 cubic feet. To reduce evaporation losses, all tanks have been furnished with the Wiggins-type floating roofs, for which Austria's VOEST company has obtained the license from General American Transportation Corp.

A number of feeds are stored between processing steps in intermediate tanks. End products stored on the refinery site are fuel oil (total storage space 6,885,450 cubic feet, ranging from 176,550 cubic feet to 1,412,000 cubic feet tanks); LPGas; propane (70,620 cubic feet); butane (123,585 cubic feet); top spindle oil; and residues. Other products are sent to the Lobau tanks. Loading facilities for trucks and tankcars are on the refinery site, for barges in the Lobau oil port.

Waste water is collected in a single drainage system, sent through a centrifuge for separation of oil particles, and then disposed of in the Danube. Emergency refinery gas is sent to a flare, which is 183.7 feet above ground and is able to burn 1,412,400 cubic feet of gas per hour. END

BEHIND THE MACHINE

Advanced designs; a wide range of types and sizes; high performance figures; these are the results of over twenty years' experience of design, research and manufacture of gas turbines by AEI engineers.
AEI gas turbines have been installed in aircraft and merchant ships and in frigates and destroyers of the Royal Navy. Industrial machines are suitable for every mechanical drive application as well as power generation, and they have output ratings of 1,750 kW and upwards.

The picture shows work on the rotor of an L21C gas turbine being built for the Basrah Petroleum Co. Larger machines of similar design —the L51C—were recently installed in Iran to supply power for the electrification of the Gach Saran oilfield.

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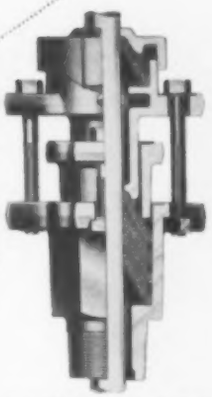
CONE PACKED STUFFING BOXES

For general service Hercules Stuffing Boxes are constructed from malleable iron. For service on wells with corrosion or electrolytic conditions, Hercules Stuffing Boxes are available made from other test-proven metals.

PREFERRED for 34 years by Experienced Oil Men

HERCULES REGULAR TYPE DUPLEX STUFFING BOX

More efficient operation with fine adjustment possible. Offers longer packing life due to ability of Packing and Glands to follow lateral movement of Polished Rod. Malleable iron construction prevents breakage if rods are accidentally dropped on Stuffing Box. Has male thread to screw into Pumping Tee.

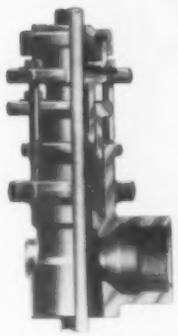


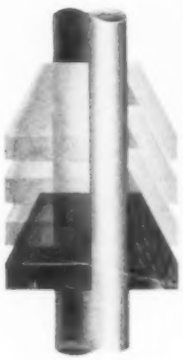
HERCULES OIL RESERVOIR GLAND

All Hercules Stuffing Boxes may be equipped with *Oil Reservoir Upper Glands* for *problem* wells which pump off and burn packing. The polished rod runs through the Reservoir, and is cooled and lubricated by its fluid.

HERCULES TEE TYPE DUPLEX STUFFING BOX

A combination Tee and Stuffing Box only 15" high. Eliminates one threaded connection between Stuffing Box and Tee. Full opening—allows rods to be run or pulled without removing Stuffing Box body. Has female thread to screw directly onto tubing.





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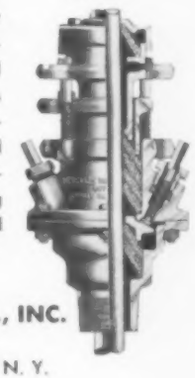
Each set of rings contains a solid ring as the bottom one. This provides greater contact with the polished rod and a more substantial base for the upper ones. This results in longer packing life and superior performance. A complete set consists of three *regular* and one *bottom* ring.

HERCULES TYPE DP (Double Packed)

Duplex Stuffing Box for use on high pressure or intermittently flowing wells. Allows Main (upper) Packing to be safely and easily replaced while well is under pressure. The two compression bolts (A) are turned clockwise until the lower Packing seals off. The Main Packing can then be removed and replaced.



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Above: the two giant petrochemical barges rest at one of Avondale's outfitting docks. The lead barge, on the outboard side, is complete and ready to be picked up for delivery. The trailing barge, on the inboard side, is still under construction

Above right: the first of the cargo tanks is lowered into the hull of the Phillips barge

Right: Stern view of the Phillips barge showing refrigeration machinery

Huge petrochemical barge is ready for service

Featuring automatically controlled refrigeration equipment, and a number of "Firsts," these barges and specially constructed tanks represent a new approach to the movement of petrochemicals

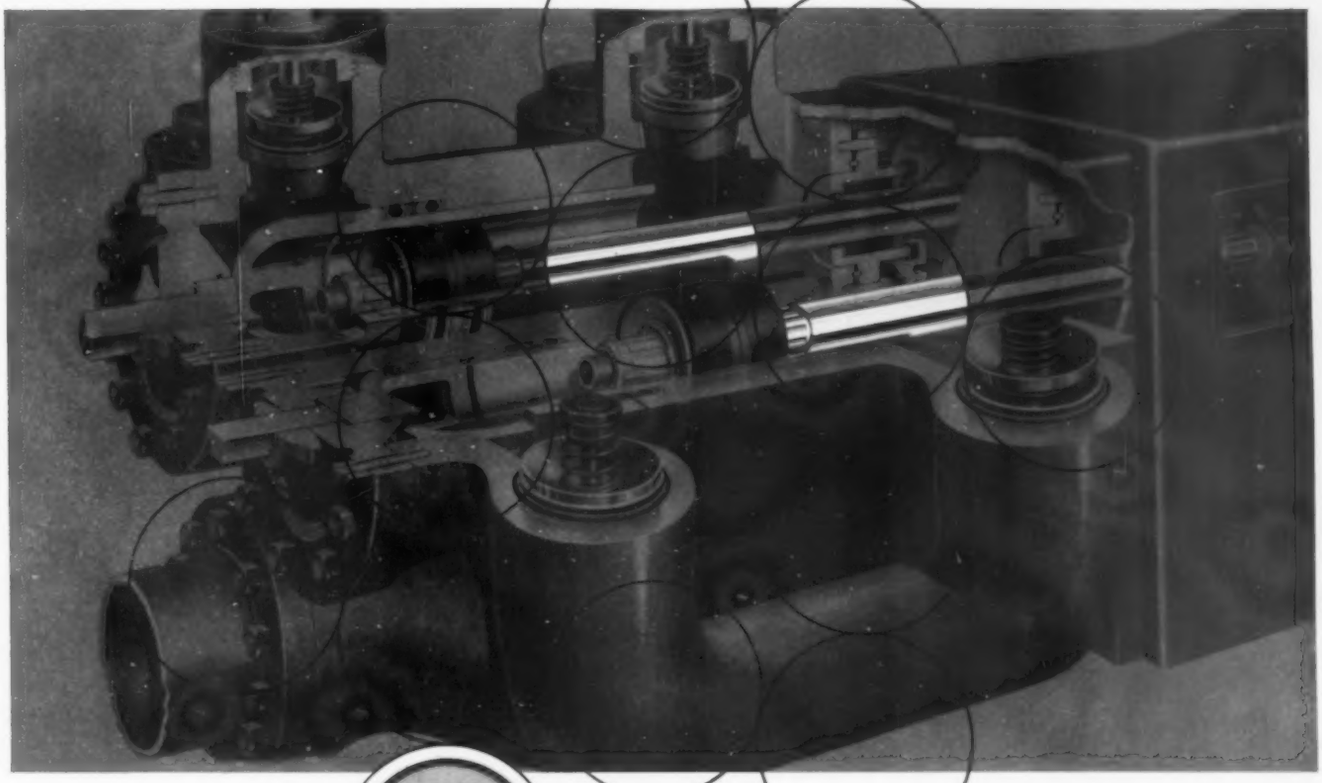
RECENTLY COMPLETED, the first of two refrigerated Propane-Ammonia Barges built by Avondale Shipyards for the Phillips Petroleum Company of Bartlesville, Oklahoma introduces a new concept in petrochemical transportation.

These barges, largest of their kind ever constructed for the chemical or petrochemical industry, each will carry 1700 tons of Anhydrous Ammonia, refrigerated to minus 28°F in their two 16′ o.d. by 242′6″ l.o.a. cargo tanks. The lead barge is 305′ x 44′ x 12′6″ while the trailing barge measures 284′ x 44′ x 12′6″. They may be handled independently or as an integrated tow.

The tanks are of 7/16″ special low temperature steel with hemispherical heads fabricated by Avondale. The desired temperature of the cargo is attained, and maintained, by refrigeration machinery installed on the barges and equipped with fully automatic controls. In the event of failure a stand-by refrigeration set is designed automatically to cut in and hold the temperature of the cargo while repairs are being made.

The 242′ tanks are the longest yet built for barge transportation of petrochemicals and their construction and installation were accomplished by specialized facilities of the New Orleans Shipyard. The barges were launched and the huge tanks, after fabrication and stress relieving, were lowered into place by means of Avondale's 600-ton lifting device. Piping was then completed and the tanks insulated at the deep water outfitting dock.

Mission rods are here to stay



because Mission Super-Chrome rods have 2 wearing surfaces

Ordinary rods must fight corrosion fatigue as well as the fatigue from tensile and compressive stresses. But, the tough, hard-chrome plating you see in the photograph protects Mission Super-Chrome® rods against corrosion fatigue. That's one more reason Mission rods last longer. Beneath the coat of heavy chrome you can see the deep, file-hard case. Inside is the tough, high strength core. Its unusually high ductility will resist the fatigue induced by literally millions of tension and compression cycles, while the chrome plating resists the corrosion fatigue which could be induced by millions of gallons of drilling fluid. Mission Super-Chrome rods are sure to stay in your pump longer than any others. Specify Mission parts all the way and save all the way.

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OIL COMPANY STAFF CHANGES

H. F. Prioleau

C. B. Marshall

HORRY F. PRIOLEAU, retiring president and chief executive of Standard-Vacuum Oil Co., will be succeeded by **CLIFFORD B. MARSHALL,** executive vice president, whose election June 13 followed Prioleau's announcement that he would relinquish all duties on July 1. **J. A. McQUILKIN,** vice president, was elected executive vice president. Both Prioleau and Marshall have been directors of Stanvac since 1949. Prioleau's retirement coincides with his completion of 40 years in the oil industry, nearly all devoted to oil operations abroad. He became Stanvac's president and chief executive officer in 1953.

Prioleau joined Standard Oil Co. (New Jersey) as a laboratory assistant in its Charleston (S.C.) refinery immediately after his graduation from the University of Virginia in 1921. Rapid advancement led him to New York in 1925, and his interest in foreign oil operations began two years later when he became assistant to the head of Latin America refinery operations.

In 1929, he went to The Hague as refining executive for a Netherlands affiliate. When Socony-Vacuum and Jersey Standard interests in the Far East were merged in Stanvac in 1933, Mr. Prioleau continued at The Hague as general manager of the new company's producing and refining interests in Indonesia.

War closed The Hague headquarters in 1940, and Mr. Prioleau rejoined Jersey in New York. In 1944, he was elected a director and vice president of Creole Petroleum Corp. He was senior vice president when, in 1949, he returned to Stanvac as a director and vice president.

The new Stanvac president, Marshall, has devoted all of his 41 years in the oil industry to operations in the Far East. He joined Socony as a foreign service trainee in 1920 and was shortly transferred to Ceylon as an accountant. Marketing became his primary interest in 1924 when he was transferred to India where he was to remain for 25 years. He was general manager of Stanvac's India division when he was called to New York in 1949 to join the board of directors. He has been a vice president since 1952 and was elected executive vice president in 1960.

Marshall is president and a member of the board of directors of the Far East-America Council of Commerce and Industry.

McQuilkin, the new executive vice president, has been a Stanvac director since 1952 and vice president since 1960. He served Stanvac for 25 years in Southeast Asia before coming to New York in 1950 as area manager for Southeast Asia.

He entered the oil industry in 1926 and was shortly sent by Socony to Singapore as a marketing assistant. His advancement through increasingly important marketing assignments in Malaya and Thailand was interrupted when he was interned by the Japanese during World War II in Santo Tomas prison in the Philippines. After the war, he was appointed general manager of Stanvac's Malaya/Thailand division and continued in that post until coming to New York.

DR. HEINZ HEINEMANN has been appointed manager of research and development by The M. W. Kellogg Co. Heinemann joined Kellogg's research staff in 1957, after prior service with Houdry Process Corp. He is a past president of the International Congress on Catalysis, a former chairman of the Catalysis Club of Philadelphia, and a member of numerous chemical and technical organizations including the American, Swiss, and German Chemical Societies.

HAL. W. STEWART, general counsel and a member of the board of directors of The Ohio Co., retired July 1 after 39 years of service. **CLAYTON L. ORN** has been appointed general counsel and elected to the board to succeed Stewart. Orn is presently the company's general attorney.

J. A. McQuilkin

M. W. Johnson

M. W. JOHNSON has been named regional coordinator for Europe, the Mediterranean area and West Africa, Standard Oil Co. (New Jersey). He succeeds **W. A. M. GREEVEN** who was elected a director of the company at the annual meeting of shareholders last month. **IVAN R. CUNNINGHAM,** formerly a director and vice president of International Petroleum Co. Ltd., an affiliate of Jersey Standard, will succeed Johnson as regional coordinator for Latin America.

Mobil International Oil Co. is realigning its operations by setting up four regions instead of three. The new regions are:

Inner Europe (Austria, Belgium, France, West Germany, Italy, Luxembourg, Netherlands, Switzerland). **CURTIS M. KLAERNER** is regional vice president.

Northern and Southeastern Europe (The United Kingdom, Denmark, Norway, Sweden, Finland, Greece, Turkey and Cyprus). **ARTHUR L. LANCKTON** is regional vice president.

Latin America and Caribbean, with **EARL A. BROWN JR.** as regional vice president.

Mediterranean and West Africa (Portugal, Spain, North and West Africa, and non-concessionary operations in the Middle East). **JOHN C. DEAN** is regional vice president.

The four regional vice presidents will report to **RAWLEIGH WARNER JR.,** executive vice president for operations. **ROBERT SIEGEL,** also an executive vice president, will continue to hold the responsibility for Middle East concessionary interests.

A new position, vice president for plans and programs, has been created to direct planning, supply and distribution, international sales, and product planning for Mobil International. **WILLIAM P. TAVOULAREAS** has been named to this position.

JAMES Q. RIORDAN has been named manager of Socony Mobil Oil Co.'s newly formed corporate planning and economics department. He will coordinate and review plans, and provide staff service to the president and executive committee. The new department results from a merger of the economics and special studies function and the planning and analysis department. **R. RUSSELL DICKSON JR.,** formerly economics department manager, was named assistant manager of the new department. He joined the company in 1959 as manager of special studies.

HAROLD G. OSBORN, a 40-year employee and a director and senior vice president of Continental Oil Co., retired June 30. Mr. Osborn has been responsible for the company's research and development, petrochemical, and engineering activities and has traveled extensively throughout the world to help develop company investments in foreign countries. In 1960 he received an honorary doctor of science degree from the University of Tulsa for "distinguished service to education."

DR. D. L. YABROFF has been made manager of chemical research and development at Shell Development Co.'s Emeryville Research Center. He will direct the long range research and development activities in the field of petrochemicals for Shell Chemical Co.

VIVIAN E. SICKS, formerly vice president of Cities Service Refining (Canada) Ltd., in charge of operations of the refinery at Trafalgar, Ontario, has been named operations manager for **PASA,** which plans to build and operate a major petrochemical facility in Argentina. PASA is jointly owned by Cities Service and four partners. Mr. Sicks will be stationed temporarily in the New York office of PASA. **HAROLD W. TORGESON,** who has been plant manager at the Cities Service refinery at Ponca City, Oklahoma, will be transferred to the Trafalgar refinery as plant manager.

EDWARD LITTLEJOHN has been named manager of headquarters public relations department, Humble Oil & Refining Co., Houston, Texas.

ALFREDO FEDERICO BRACHT, Argentine business executive and financier, has been elected president of Petroquimica Argentina, S.A. (PASA). **DR. WESLEY S. COE** is now managing director of PASA.

C. S. DEDON has been appointed employee relations adviser for Mobil Chemical Co. with special emphasis on overseas activities. **H. L. C. HOLLIDAY** will succeed Dedon as employee relations adviser for Mobil International Oil's Africa and Southwestern Europe regions. He will continue his Middle East responsibilities.

EDWARD R. NEPKIE has been appointed commercial manager and a director of Dow-Unquinesa S.A., Bilboa, Spain, a Dow associate company.

VERNON M. TURNER, a member of Tennessee Gas Transmission Co.'s legal department since 1955, has been promoted to associate general attorney for the company.

ATHOLL McBEAN has resigned from the board of directors of Standard Oil Co. of California after 19 years of service on the Board. McBean, 82, said he has long favored an age limit for the retirement of directors and he said he felt his withdrawal will make a place for a younger man "who can meet the exacting demands of the office."

EARLE MARSHALL, a vice president of Empire Trust Co., New York, has been elected to the board of directors of White Eagle International, Inc.

A. APPLEMAN has been named manager of a newly created traffic department of Esso International Inc., an affiliate of Standard Oil Co. (N.J.). The department will arrange transportation of oil products, chemicals and purchased materials—in packages and in deep tanks of common carrier vessels—from the United States to overseas affiliates of Jersey Standard in both the Western and Eastern Hemispheres.

R. A. Appleman

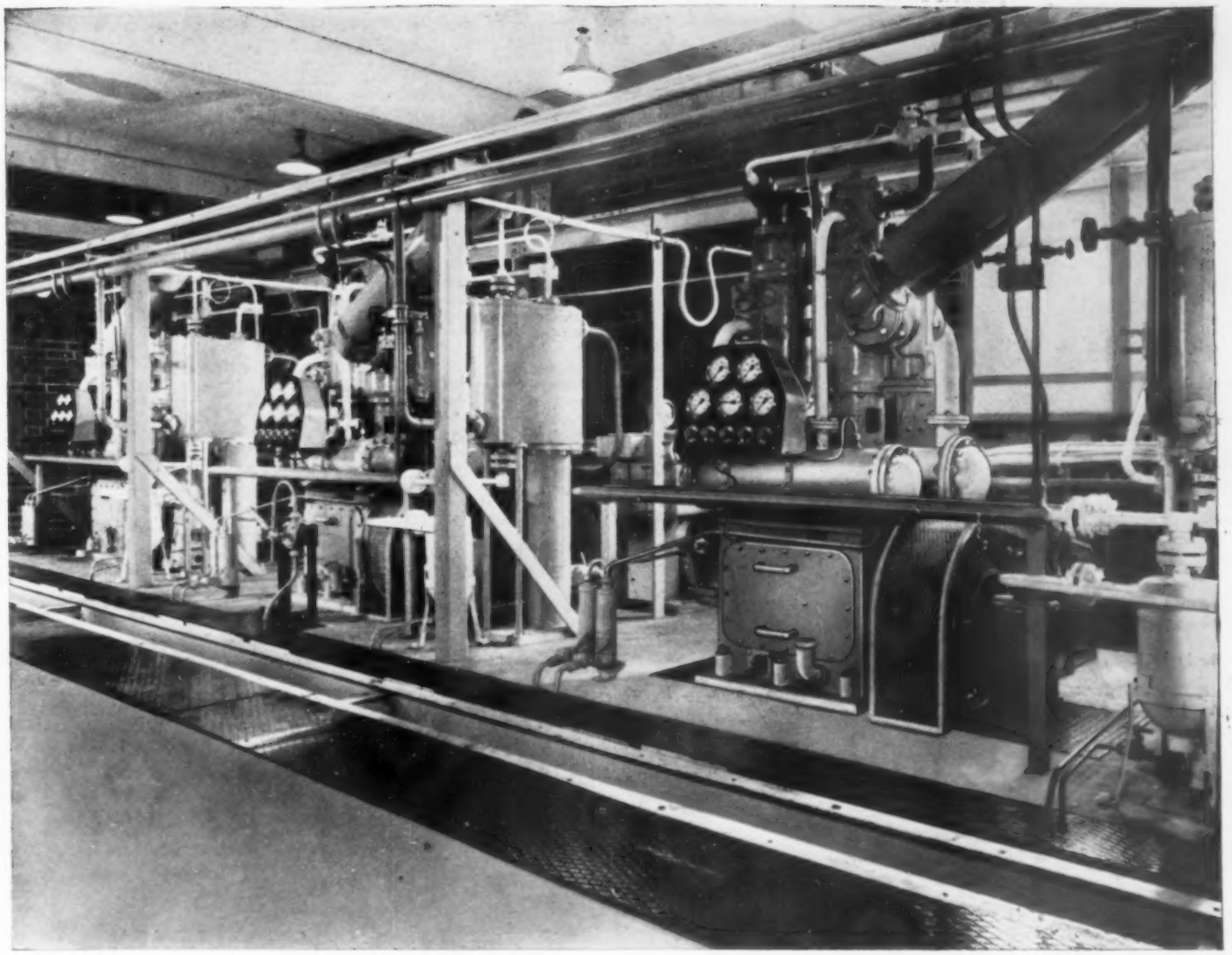
P. C. Thomas

PURDOM C. THOMAS has been named vice president in charge of nation-wide marketing for Shell Oil Co. in the United States. He succeeds **J. G. "Doc" JORDAN,** who will retire Dec. 31, after more than 36 years of service. **JACK H. HALL,** general manager of head office marketing, will succeed Thomas.

THOMAS S. GATES has been elected to the Board of Cities Service Co. Gates is chairman of the executive committee of Morgan Guaranty Trust Co. of New York. He served as Under Secretary of the Navy from 1953 to 1957, as Secretary of the Navy from 1957 to 1959, as Deputy Secretary of Defense from June to December 1959, and as Secretary of Defense until January 1961.

L. A. SMITH has been named deputy coordinator of producing activities Standard Oil Co. (New Jersey) to succeed **ZEB MAYHEW** who has been elected a director and executive vice president of International Petroleum Co., Ltd., a Jersey Standard affiliate. Smith will be succeeded in his former position of assistant coordinator of producing activities by **W. J. BARNETT,** who will be replaced as producing advisor for Europe, Mediterranean and West Africa by **J. F. MOORE, JR.** Moore was previously assistant producing advisor for the same areas.

(Continued on page 66)



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C. A. Herter, Jr.

Dr. A. Lewis, Jr.

CHRISTIAN A. HERTER Jr. will join Socony Mobil Oil Co., Inc., in September, to advise the company on government relations at the state, federal, and international levels. **RAY C. HINMAN,** widely known among government officials as an expert in oil industry affairs, will retire from the company on Oct. 1, but will be retained by Socony Mobil as a legislative consultant, specializing in issues before the New York State Legislature.

CHARLES W. SAVILLE was named general manager of the foreign producing department (Western Hemisphere), of Texaco Inc. **EDWIN L. GORHAM, Jr.,** was appointed assistant general manager (Operations) of the department. **ROBERT H. MARTIN** was made chairman of the Executive Producing Committee, succeeding Mr. Saville. **ROBERT N. HARDING** was appointed assistant to the senior vice president. Mr. Saville joined Texaco as a geologist in Colombia in 1937 and served in that country until 1952. He was then transferred to New York where he held increasingly important positions in Texaco's foreign operations department. He was named chairman of the executive producing committe in 1957.

The newly appointed technical subcommittee of the National Petroleum Council's Committee on Petrochemicals will be headed by **THOMAS L. CUBBAGE,** vice president, Phillips Chemical Co., Bartlesville, Okla.

A. S. C. Hulton

G. T. Piercy

A. S. C. HULTON has been elected president and a director of Asiatic Petroleum Corp. succeeding **DAVID H. BARRAN** on the latter's appointment as a managing director of the Royal Dutch/Shell Group in London. Hulton has also been appointed a director of Shell Caribbean Petroleum Co. and Chairman of the Executive Committee of the Board.

Prior to these appointments Hulton was since 1957 a director of Shell International Petroleum Co. Ltd. and its coordinator for Africa and Middle East since 1959. Prior to that he was managing director of Shell Tankers Ltd. His earlier career was spent largely in the United States; first on the West Coast with Shell Oil Co. and then in New York and Washington, D. C. with the administration controlling oil supply and tanker movement from the U.S.A. to the Allies during the war. From 1951 to 1953 he was vice president (Transportation and Supplies) of Shell Oil Co.

JOHN A. WALSTROM has been elected to succeed Barran as president of Shell Caribbean Petroleum Co. He has been a vice president since 1953 and a director since 1957.

CARL F. VANDER CLUTE

Carl F. Vander Clute, sixty, general manager of the marine department of the Gulf Oil Corp., 17 Battery Place, New York, died June 1 at his home after a long illness. Mr. Vander Clute has been associated with the marine industry since 1919 and for many years took a leading part in management negotiations with maritime unions. Surviving are his wife, Mrs. Agnes Vander Clute, and a son, Norman Vander Clute.

E. Colton

K. S. Manning

Because of increased operations on a world-wide scale, Gulf Oil Corp. has re-aligned the functions of its former manufacturing department by establishing three new corporate departments, the petrochemicals, product supply and refining departments.

DR. ALEXANDER LEWIS, Jr., a Gulf vice president, will head the petrochemicals department and be responsible for the corporation's world-wide activities in this field. He will be a member of Gulf's administrative committee in the general office, Pittsburgh.

K. S. MANNING, a Gulf coordinator, will be responsible for the coordination of Gulf's world-wide activities in product supply. He will be chairman of the Product Supply Council and a member of the administrative committee in Pittsburgh.

J. N. McGARVEY has been named manager, responsible for Gulf's product supply operations in the U.S.

R. P. HOOPER, Manager, Gulf Eastern Co.—Gulf's European subsidiary—will be responsible for product supply operations in the eastern hemisphere and will headquarter in London, England.

G. L. BENJAMIN, Manager, Product Trading, will be responsible for Gulf's western hemisphere activities in the disposition of residual fuel oil as well as cargo sales and purchases required to balance the product supply program. He will headquarter in New York City.

ERNEST COLTON, a Gulf coordinator, will be responsible for the coordination of the company's world-wide refining activities. He will be chairman of the refining council and a member of the administrative committee in Pittsburgh.

B. H. BARNES, a Gulf vice president, will be responsible for Gulf's refining operations in the United States and will headquarter in Houston, Texas.

C. D. READ, vice president of Gulf Eastern Co., will be responsible for refining activities in the eastern hemisphere and will headquarter in London.

GEORGE T. PIERCY has been appointed executive assistant to M. J. Rathbone, president and chief executive officer of Standard Oil Co. (New Jersey), succeeding **CHADWICK H. CARPENTER** in the post. Carpenter has been elected a director of Esso Mediterranean, Inc., with headquarters in Geneva, Switzerland.

VICENTE VALLE has been appointed director of personnel relations for Refineria Panama, S.A. Formerly assistant industrial relations group head at Creole Petroleum Corp.'s Amuay refinery in Venezuela, he will make his new headquarters in Colon in the Republic of Panama.

The Atlantic Refining Co., has announced that, with the retirements later this year of **K. G. KRECH,** manager of crude oil supply, and **H. M. HANCOCK,** manager of product control, three new manufacturing departments will be created and the following individuals named as managers:

B. E. MILNER, now in charge of the refinery at Port Arthur, Texas, will become manager of the refinery supply department. Reporting to Milner as head of crude oil supply will be **S. K. McCAULEY. A. W. KUSCH** will succeed Milner as the new manager of the Port Arthur refinery. **J. C. CREW** will advance to manager of the product planning department, and **W. E. CHALFANT** will become manager of the product quality department.

THOMAS D. DURRANCE has been elected vice president public relations for the Arabian American Oil Co., succeeding **H. O. THOMPSON,** who will serve the company in a consulting capacity. Durrance joined Aramco in March 1960 as manager of the public relations department in the Middle East. He will continue to make his headquarters in the Middle East. Previously he had served with Texaco Inc. as director of public relations. Before entering the petroleum industry, Durrance held editorial positions with the Office of War Information, Time and Kiplinger magazines, and Barron's. He was also a senior information specialist with the Marshall Plan in Europe.

DEWEY D. BILLODEAU has been named plant manager of United Carbon's new carbon black plant in Port Jerome, near LeHavre in northern France. The plant will be operated by a new subsidiary, United Carbon France, S.A., under the direction of George Webster, president and general manager. It will be fully operational late this summer.

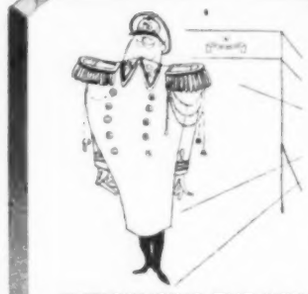
PAUL J. WOLFE has been promoted to the newly created position of planning manager for Mobil International Oil Co.

DR. HENRY B. HASS has just been appointed director of chemical research by The M. W. Kellogg Co. Dr. Hass will direct the activities of the exploratory and research groups of the company—a world-wide engineering and construction organization.

J. E. ROTH, senior vice president, will assume an increasing number of special executive assignments and more directly assist the president in the direction of Tidewater Oil Co. activities. **CHARLES R. BROWN** vice president and general manager of Tidewater's western division, has been appointed a member of Tidewater's executive management and will assume the newly created position of group vice president for exploration and production activities. **JAMES McDONALD,** assistant western division general manager, has been promoted to vice president and succeeds Brown as western division general manager.

GEORGE A. LAWRENCE, manager of public relations department of Imperial Oil Ltd., has been appointed deputy director of public relations for Standard Oil Co. (New Jersey). Imperial is Jersey's Canadian affiliate.

C. A. BROWN and **W. K. TELL,** both members of the legal department of The Ohio Oil Co., have been appointed to positions of general attorney. Brown has been made general attorney for domestic production, and supply and transportations operations. Tell, who joined the Ohio Oil Legal Staff in 1943, after 12 years of private practice in Chicago, has been named general attorney for domestic refining and marketing operations.



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INTERNATIONAL NEWS AND NOTES

ALGERIA—Exports of crude oil from Algeria and the French Sahara were 3,577,345 tons in the first quarter of this year, about 27.5 million bbls, it is reported. Some 1,749,838 tons left the port of Bougie and was crude from the Hassi Messaoud field. Some 1,827,507 tons left La Skhirra, and was crude from the Edjeleh region fields. In all of 1960, some 6,561,088 tons left Bougie and Philippeville, and 1,510,725 tons left La Skhirra, for a total for Algeria of 8,071,813.

ARGENTINA—By recent decree, the government of Argentina has opened much of the country to international oil contract bids. The decree itself (reproduced below) was preceded by an elaborate statement outlining (1) the need for oil development; (2) the lack of capital available to the government's YPF; (3) the favorable results of oil contracts already let; and (4) the need to let oil contracts to pay for the proposed new gas pipeline from Comodoro Rivadavia to Buenos Aires. There follows a translation of the decree.

Therefore, the president of the Argentine nation decrees:

Article 1: Within each petroleum region of the country there shall be reserved for the exploitation "by administration" by YPF, the areas that are considered absolutely essential for ensuring the logical expansion of the works of said organization, regard being had for the maximum utilization of the means that it has at its command. The aforementioned areas shall be established with precision by decree of the National Executive Power upon proposal of YPF for each of the petroleum regions, there being taken into consideration the activities of the organization during a reasonable period of forthcoming years.

Article 2: For exploiting areas not included in the reservation of the foregoing article, YPF will proceed at the earliest possible date with the letting of "contracts of exploitation" with national and/or private companies, of characteristics similar to those of contracts already existing, with introduction into them of any changes that experience has taught. The contracts in question shall in the first place be let with a view to intensifying the development of the "South Flank" of Comodoro Rivadavia.

Article 3: The awarding of areas in accordance with the system provided for under the present decree shall be done by competitive bidding and/or submission of tenders and in keeping with sheafs of conditions drawn up by YPF. YPF shall accord national companies reasonable preference to enable them to set up capital and exploit the deposits with good probabilities of success. After the receipt of offers formulated by the companies, who shall be permitted to suggest the areas that interest them, to the exclusion of those reserved for YPF, this organization will have to distribute said areas in a way that will ensure the cooperation of the greatest possible number of contractors for the purpose of intensifying and accelerating the works.

Article 4: In any areas where YPF has carried out works of exploration of importance and has verified the existence of petroleum, one of the conditions to be laid down for contractors will have to be the condition that they shall pay YPF specific sums in compensation for the discoveries made, the works carried out and the petroleum computed. The national companies will be able to be exempted from such obligation. YPF shall employ the funds thus obtained for its own capitalization.

AUSTRALIA—First deep test in the area of Mornington Island in the Gulf of Carpentaria started in May by Santos Ltd. and Delhi Australian Petroleum Ltd. Projected depth is 6,000 ft.

AUSTRALIA—Texaco Overseas Petroleum Co. has relinquished its interest in West Australian Petroleum Pty. Ltd. (WAPET). Topco is a wholly owned subsidiary of Texaco Inc. The interest now being given up will be held by other participants in WAPET's operations. These are Ampol Exploration Ltd., California Asiatic Oil Co., and Shell Development (Aust.) Ltd. Their present holdings will be Ampol 20%; California Asiatic 40%, and Shell 40%.

BELGIUM—A newly formed foreign company—Sinclair Belgium, S.A.—has entered into a long-term agreement to supply petroleum products to the Combulic Group, an established Belgian distributor. The move extends the Sinclair organization's operations in marketing of branded products in Europe. Sinclair Belgium, S.A., a subsidiary of Sinclair Refining Company, is immediately starting the construction of a deep water marine terminal in the harbor of Zeebrugge, part of the City of Bruges. The Combulic Group is a cooperative founded in 1948, and distributes through about 1,700 coal and fuel oil merchants in Belgium. It maintains bulk storage and distributing facilities in 10 principal cities of Belgium, including Antwerp, Brussels, and Ghent.

BOLIVIA—YPFB produced 3,110,445 barrels of crude oil last year, a drop of 59,683 barrels or 1.88% from the 1959 output of 3,170,128 barrels. Output by fields was Camiri 2,640,823 in 1960 (2,657,345 in 1959), Bermejo 449,566 barrels (481,409 in 1959) and Sanandita 20,056 barrels (31,374 in 1959).

Crude oil runs to stills came to 2,261,073 against 2,210,566 barrels in 1959. Output of regular motor gasoline was 892,605 barrels, of fuel oil 541,869, of kerosine 400,142, diesel oil 344,282, of 80 octane gasoline 6,904 and of 75 octane gasoline 3,626, of gas 38,571 barrels, of solvent 473 barrels of 80 octane aviation gasoline 101 barrels and losses were 32,500 barrels.

Crude oil exports, all to Argentia, were 867,827 barrels last year against 948,266 barrels in 1959. Some products were exported to Chile and Paraguay. Product exports were 38,436 barrels of crude oil, 4,025 barrels of fuel oil, 1,913 barrels of diesel and 126 barrels of kerosine.

Twenty-four wells were completed for a total of 37,297 meters, against 42,283 meters in 1959, a drop of 13% in meters. In use at the start of the year were 12 rotary drills and one cable drill. YPF output of natural gas was 48,835,574 cubic meters, a gain from the 35,537,462 cubic meters in 1959.

Bolivian Oil Co. produced 73,719 cubic meters from the Madrejones field in 1960 from the start of operations in April, 1960, and delivered 36,615 to YPFB, and exported 35,050.5 cubic meters to Argentina.

Crude oil output by YPFB in the first quarter of 1961 was 708,705 barrels, it is reported. By fields the output was Camiri, 592,043 barrels; Sanandita, 3,653 barrels; and Bermejo 113,009 barrels.

Crude oil input at refineries was 600,108 barrels. Crude oil exports were 27,056,372 barrels, all to Argentina.

GERMANY (WEST)—Six South Germany cities have set up a company, Gasversorgung Sueddeutschland GmbH (South German Gas Supply, Ltd.) at Stuttgart to construct a gas pipe line from Mannheim to Kehl to Ulm, about 300 kilometers. The company has applied to the Baden-Wuerttemberg Ministry of Economics for a permit. Cost is estimated at $20 million U.S. Completion date is to be late in 1963.

The cities are Stuttgart, Mannheim, Pforsheim, Ulm, Baden-Baden, Goppingen. Heidelberg and Karlsruhe are expected to join in. Sources of supply of gas are Karlsruhe oil refineries under construction, coke gas from the Saar, Strasbourg oil refineries under construction, and Ingolstadt oil refineries and Bavarian natural gas. Mannhein-Ulm will be the first section built. Future plans call for extension from Kehl to Freiburg, some 60 kilometers, to cost $4 million U.S.

GERMANY (West)—A new company is to be formed soon—Rein-Donau-Oelleitungen GmbH—to construct an oil pipe line from Karlsruhe to Ingolstadt. Taking part will be Esso AG, Deutsche Shell AG, Benzin Petroleum AG (B), Deutsche Erdoel AG, Mobil Oil in Deutschland, Wintershall AG, Gelsenberg Benzin AG, Scholven Chemie AG and Compagnie Francaise des Petroles (TOTAL).

This was announced by Dr. Otto Schedl, Bavarian Minister of Economics and Transportation, who is fighting plans aimed at hindering the line.

Suedpetrol AG fuer Erdoelwirtschaft is working on right of way problems with farmers and other landowners for construction of its oil pipeline from Vorarlberg to Ulm to Ingolstadt to Stuttgart. Suedpetrol has bought 21 acres in Altheim, north of Ulm, as the site of a control station, a pump station and storage tanks.

IRAQ—Total crude oil production in the first four months of this year was 15,560,952 long tons, it is announced.

Iraq Petroleum Co. accounted for 11,956,591 tons. Basra Petroleum Co., accounted for 3,173,850 tons. Mosul Petroleum Co. accounted for 430,511 tons.

KUWAIT—The Contracting and Trading Co. (Kuwait) has been awarded a contract by the Arabian Oil Co., for coating, in the Neutral Zone, approximately 45 miles of 12, 14, 16, 26 and 30 inch pipe with coal tar enamel and concrete by machine.

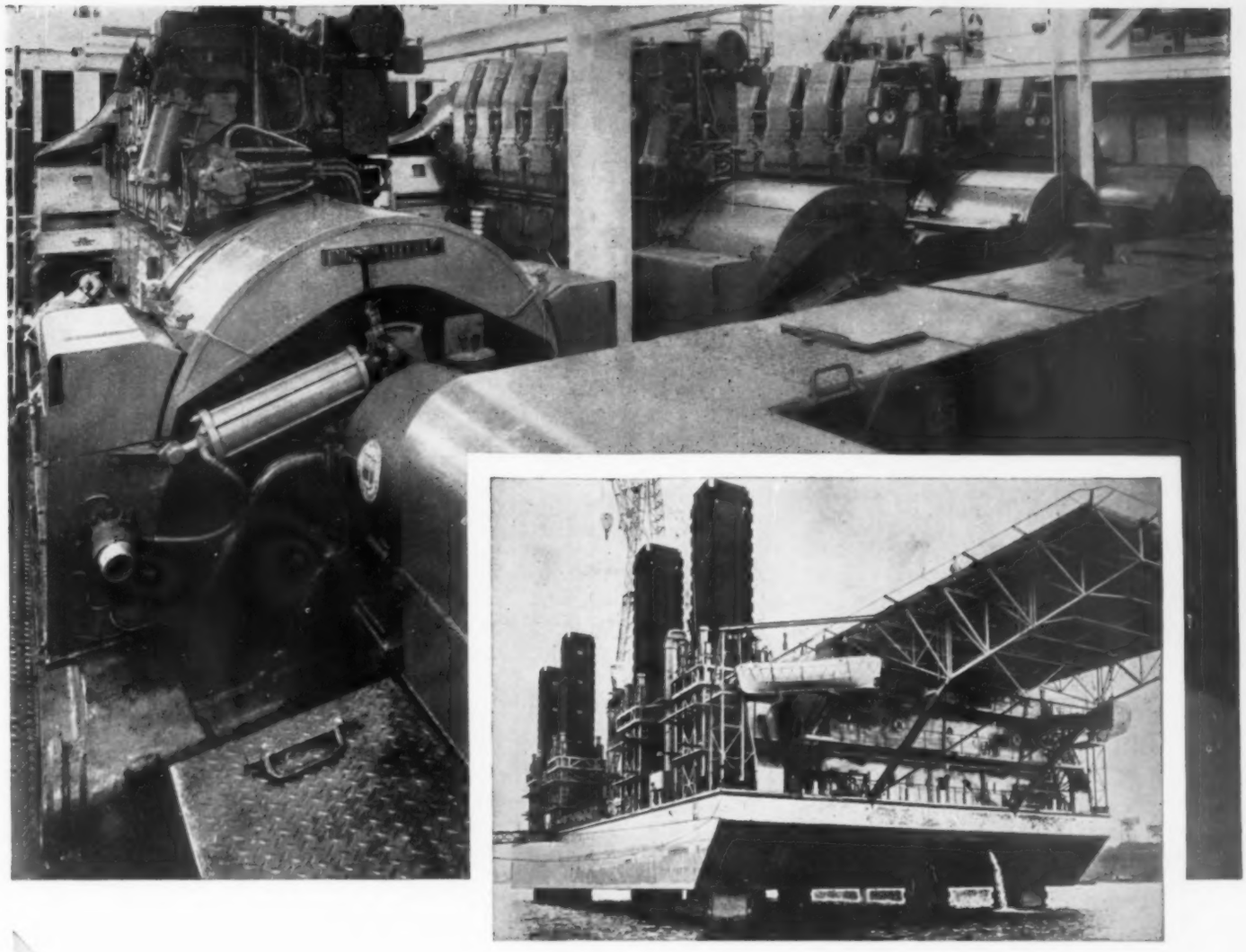
LIBYA—Through April 1, 1961, a total of 242 wells had been completed in Libya. Some 87 found oil, seven gas and 149 were dry holes.

Tested oil production was 150,704 b/d. Of the nine original concession holders, seven have brought in producing wells. They are Esso, Oasis, Shell, Mobiloil, Amoseas, Libyan American, CPTL. British Petroleum and Nelson Bunker Hunt so far have failed.

By April 15, the total of oil wells had risen to 88. The estimated production is 152,700 b/d. The successful oil wells by province: Tripolitania, 51; Cyrenaica, 33; Fezzan, 4.

The oil wells found by company: Oasis Oil Co. of Libya, 43 and 65,476 b/d: Esso Standard (Libya) Inc., 17, and 62,299 barrels; Esso Sirte (Esso Standard and Libyan American) 6 wells, and 7,375 b/d; American Overseas Petroleum Cp., Ltd. 6, and 6,700 b/d; Gulf Oil Co. of Libya, 6, and 4,525 b/d; Mobil Oil of Canada, 6, and 4,893 b/d; Libya Shell, 3, and 1,282 b/d; Compagnie des Petroles (CPTL) 1, 150 b/d.

TIMOR—Tradewinds Exploration, Inc. will start drilling the first of two test wells in the south-central portion of the island of Timor. The first of the test wells, an offset of a well known as Matai No. 1 drilled earlier in 1961, will be drilled to a depth of 1,600 to 1,800 ft to test substantial oil shows discovered by the first Matai well at depths of from 800 to 1,000 ft. Heavy water flow encountered at 2,027 ft on this first well prevented a test of the oil found at the shallower depth, although preliminary reports showed it to be 37 degrees gravity parafin base. The oil is in limestone of Eocene age. A second test well will be drilled following completion of Matai No. 2 in the Debos section, two miles from the Matai wells.



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The four illustrated are six-cylinder pressure charged, charge-cooled engines, with a continuous site rating of 795 b.h.p. at 900 r.p.m. Two of these engines drive the draw-works and rotary table through 'ENGLISH ELECTRIC' 500 kW generators and 650 h.p. motors. Surplus power can be used by means of splined clutches to supplement the power of the other two engines driving the slush pumps.

Another two engines developing 470 b.h.p. at 900 r.p.m. are coupled to 326 kW alternators providing the normal power supply of the barge itself.

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Offices and representatives throughout the world

World Petroleum Statistics

FREE WORLD SUPPLY AND DEMAND, CRUDE AND PRODUCTS, DECEMBER 1960

(Thousands of barrels)

Source: USA Bureau of Mines, Division of Petroleum

Country	CRUDE PETROLEUM					REFINED PRODUCTS			
	Production	Imports	Exports and reexports	Stock change, other demand, and loss	Total 1/ refinery input / Total 2/ refinery output	Imports	Exports and reexports	Domestic demand (incl. bunkers) 3/	Bunkers-all flags (as reported)
NORTH AMERICA									
Canada	16,422	10,774	3,423	-147	24,170	3,605	250	4/31,315	E/547
Mexico	8,398	-	66	-489	9,388	496	689	9,195	
United States (incl. Alaska and Hawaii)	221,653	28,677	512	+830	264,662	27,903	5,326	4/351,984	5,907
Subtotal	246,473	39,451	4,001	+254	298,220	32,004	6,265	392,434	
CENTRAL AMERICA AND CARIBBEAN									
Costa Rica	-	-	-	-	-	E/87	-	87	
Cuba	6	E/1,850	-	-	E/1,856	E/367	-	2,223	
Dominican Republic	-	-	-	-	-	E/259	-	259	
El Salvador	-	-	-	-	-	E/122	-	122	
Guatemala	-	-	-	-	-	E/274	-	274	
Haiti	-	-	-	-	-	E/61	-	61	
Honduras	-	-	-	-	-	E/125	-	125	
Jamaica	-	-	-	-	-	431	-	431	E/92
Nicaragua	-	-	-	-	-	E/105	-	105	
Panama, Canal Zone	-	-	-	-	-	326	166	162	446
Panama, Republic	-	-	-	-	-	E/254	-	254	
Puerto Rico	-	2,293	-	+189	2,408	589	862	2,135	
Subtotal	6	4,143	-	+189	4,264	3,002	1,028	6,238	
SOUTH AMERICA									
Argentina	7,198	1,164	-	-13	8,369	801	-	4/8,556	103
Bolivia	254	-	46	+18	190	13	5	198	
Brazil	2,987	E/4,117	E/562	-	6,542	E/2,997	-	9,539	
British Guiana	-	-	-	-	-	E/183	-	183	
Chile	662	298	-	+42	912	E/385	-	1,297	
Colombia	4,827	-	3,117	-380	2,851	E/50	E/379	1,922	E/100
Ecuador	239	258	-	+101	396	44	-	440	
Netherlands Antilles	-	22,177	-	-1,127	25,587	E/1,457	E/18,697	5/8,287	E/1,884
Paraguay	-	-	-	-	-	E/66	-	66	
Peru	1,698	-	249	+82	1,382	355	162	1,775	34
Trinidad	3,804	4,535	261	-447	8,568	200	6,462	5/2,306	1,244
Uruguay	-	537	-	-83	620	95	-	715	E/152
Venezuela	87,827	-	59,811	-3,523	31,822	E/12	25,719	4/4,661	1,358
Subtotal	109,490	33,080	64,046	-5,330	86,579	6,860	51,424	39,967	
WESTERN EUROPE									
Austria	1,485	340	593	+106	1,106	871	87	4/2,114	
Belgium and Luxembourg	-	2,598	-	-1,184	3,822	2,533	921	5,434	135
Denmark	-	-	-	-25	E/25	6,094	21	6,098	122
Finland	-	937	-	+287	E/650	855	-	1,505	
France	1,255	21,084	-	-785	23,146	1,727	4,669	4/20,890	959
Germany, West	3,493	25,536	-	+8,119	20,910	3,881	3,652	21,139	589
Greece	-	1,437	-	+191	1,246	405	-	1,651	
Iceland	-	-	-	-	-	291	-	291	
Ireland	-	1,231	-	+275	956	263	66	1,157	
Italy	1,253	17,931	107	-1,489	21,779	1,481	4,129	4/16,304	1,910
Netherlands	1,282	10,519	-	-1,744	14,453	3,410	8,535	9,328	904
Norway	-	306	-	+236	E/70	3,317	-	3,387	E/183
Portugal	-	1,190	-	+402	788	674	172	1,290	E/250
Spain	-	2,346	-	-280	2,675	358	107	2,926	E/198
Sweden	-	982	-	-1,837	2,819	10,086	72	12,833	E/247
Switzerland	-	-	-	-	-	2,190	1	2,189	
United Kingdom	57	25,654	-	-3,945	29,698	10,670	6,312	4/32,503	2,350
Yugoslavia	726	E/155	-	-	881	E/150	E/49	982	
Subtotal	9,431	112,268	700	-1,673	128,984	49,261	28,789	142,001	
MIDDLE EAST									
Aden	-	3,794	-	+157	3,637	893	1,955	2,575	2,569
Bahrain	1,399	5,066	-	-	6,465	1	6,825	1,265	362
Iran	36,542	-	25,071	-374	E/11,845	-	6,960	4,885	E/587
Iraq	30,737	-	E/29,625	-	E/1,112	E/-	-	1,133	
Israel	71	E/804	-	-	E/875	E/548	6	1,767	E/90
Jordan	-	E/132	-	-	E/132	E/23	-	155	
Kuwait	51,054	-	43,588	+1,577	7,889	-	3,134	2,735	1,649
Lebanon	-	486	-	-	486	E/33	-	519	E/67
Neutral Zone	4,847	-	E/3,700	-93	E/1,240	-	E/790	490	E/300
Qatar	5,342	-	E/5,324	-	E/18	-	-	18	
Saudi Arabia	43,152	-	34,637	+693	7,822	3	5,955	2,530	E/1,060
Turkey	284	-	-	-10	E/294	E/615	-	849	
U.A.R., Syria	-	E/642	-	-	E/642	E/99	-	741	
Subtotal	173,398	10,924	141,945	+1,950	40,417	2,566	25,005	19,662	
AFRICA									
Algeria (French Sahara)	9,807	-	9,782	+85	-	1,180	-	5/908	
Angola	46	E/81	-	-	127	E/46	E/33	140	
Republic of the Congo	-	-	-	-	-	E/188	-	188	
Canary Islands	-	1,701	-	-92	2,476	233	1,679	1,030	421
Ethiopia	-	-	-	-	-	E/37	-	37	
States formerly in French Equatorial Africa	546	-	610	-64	-	E/178	-	178	
States formerly in French West Africa	-	-	-	-	-	E/1,001	-	1,001	E/660
Ghana	-	-	-	-	-	E/297	-	297	
Kenya	-	-	-	-	-	E/377	E/75	302	E/76
Liberia	-	-	-	-	-	E/32	-	32	E/3
Malagasy Republic	-	-	-	-	-	115	-	115	
Morocco	92	E/133	-	-	185	408	-	E/546	
Nigeria	603	-	713	-110	-	515	-	515	
Federation of Rhodesia and Nyasaland	-	-	-	-	-	E/350	-	350	
Sierra Leone	-	-	-	-	-	E/149	-	149	E/127
The Sudan	-	-	-	-	-	E/249	-	249	
Tanganyika	-	-	-	-	-	E/454	E/25	429	
Tunisia	-	-	-	-	-	343	-	5/330	
Uganda	-	-	-	-	-	E/96	E/22	74	
Union of South Africa	-	711	-	-115	826	1,995	143	2,678	E/310
U.A.R., Egypt	2,176	E/1,242	288	+296	E/2,834	E/624	E/123	3,335	E/185
Subtotal	13,230	3,868	11,393	-60	6,448	8,857	2,100	12,903	
SOUTH ASIA, FAR EAST, AND OCEANIA									
Australia	-	7,401	-	-326	8,218	791	2,316	5/6,959	E/632
British Borneo	2,874	-	1,464	-	E/1,410	E/81	1,243	248	79
Burma	342	-	-	+15	327	16	10	333	
Ceylon	-	-	-	-	-	320	-	320	255
India	302	E/3,440	-	-	E/3,742	E/1,003	E/203	4,542	E/230
Indonesia	12,058	E/1,005	6,370	+98	E/7,242	E/371	E/3,121	4,492	E/178
Japan	382	20,106	-	-722	21,804	4,466	290	25,290	E/1,265
Korea, South	-	-	-	-	-	E/514	-	514	
Malaya and Singapore	-	E/117	E/310	-193	-	E/3,384	E/1,734	1,650	E/1,084
Netherlands New Guinea	109	-	E/109	-	-	-	-	Insig.	
New Caledonia	-	-	-	-	-	E/34	-	34	
New Zealand	-	-	-	-	-	E/631	-	631	E/130
Pakistan	183	-	-	-19	E/202	E/940	E/21	1,121	
Philippines	-	1,278	-	-157	1,441	E/836	-	2,277	E/14
Taiwan	1	442	-	-293	736	9	20	725	
Thailand	-	-	-	-	-	E/743	-	743	E/8
Vietnam, South (incl. Cambodia)	-	-	-	-	-	E/511	-	511	E/6
Subtotal	16,251	33,789	8,253	-1,797	45,122	14,690	8,958	51,080	
WORLD TOTAL EXCLUDING EASTERN EUROPE, U.S.S.R., & MAINLAND CHINA	568,269	237,503	230,338	-6,467	606,034	117,200	123,569	664,285	

E/ Estimate based on latest available data.
1/ Total input includes crude runs to stills plus runs of other unfinished oils, topped crude and natural gas liquids blended.
2/ Total output included refined product output plus refinery fuel and loss; excludes liquefied petroleum gases sold directly for fuel and chemical uses from natural gasoline plants.
3/ Unless otherwise specified, data represent apparent domestic demand (including inland demand, refinery fuel and loss, and bunkers). Apparent domestic demand is derived from the components of refined product output, plus imports, minus exports, with no allowance for changes in stocks.
4/ Domestic demand as reported, including refinery fuel and loss, stock changes, and bunkers; also includes, where available, liquefied petroleum gases sold directly for fuel and chemical uses from natural gasoline plants.
5/ Apparent domestic demand is heavily influenced by refinery fuel and loss, and bunker loadings.

Europe's Energy Supply— as seen by OEEC

(Continued from page 52)

this is generally recognized the prospect of continuing competition in energy markets, at least in the early 1960's, may lead some governments to utilize restrictive measures to protect their immediate interests.

Some governmental intervention may become necessary, particularly if excessive short-term pressures could cause long-term harm to a country's economy; consumers too would not benefit from a situation that forced prices so low as to jeopardize the generation of sufficient capital for the future development of energy resources. But Europe's growing interest is as an energy consumer, and any long-term policy by governments either within or outside Europe which limited free oil flow at prices consistent with its successful future development, could have serious consequences for Europe's future economic strength.

While all governments would recognize the desirability—for a number of reasons—of giving some priority to indigenous supplies, an uneconomic development of such supplies is a less satisfactory way of improving security than can be gained from the greater diversification of sources and building up stocks as recommended by OEEC. However, a large proportion of Europe's imported oil needs will continue to come from a limited number of exporting areas, although the greatly expanded production, and particularly transport capacity, has helped to reduce the risks involved.

The cost of increased oil imports should be within Europe's balance of payments capacity, although individual countries may be faced with difficulties from time to time. The cost will be offset by the net receipts of foreign currencies from oil sales outside the area by companies resident in it as well as by the use of such receipts for investment in the OEEC area. END

The Desk & Derrick Club of New York City on a recent tour of Caribbean oil installations, shown during a visit at Lago Oil & Transport, Aruba, N.W.I.: Edna Hurry, Jersey Standard; Edith Jones, Commonwealth Gas; Nell Hagaman, Shell Oil; Elsie Jones and Sophie Schierenbeck, Gulf; Doris Finelly and Adelaid De Rose, Socony Mobil; Gertrude Munafro, Texaco Development; Helen Hutchinson and Margaret McCurdy, American Oil; and Catharine McGarrity, WORLD PETROLEUM.

NEW PUBLICATIONS

"New German Export Directory"—This export catalog offers an excellent all-over picture of products available in Germany and for export including oil country goods. The 5th edition, 1961/62, contains an alphabetical index in German, English, French, and Spanish. German export products, their manufacturers, and trade marks, are given in four languages arranged according to articles in 42 industrial groups (consumer and capital goods) with the names and addresses of the manufacturers and a comprehensive list of trade marks.

An alphabetical directory of firms giving the name, address, telegraphic address and other business data of manufacturers who offer their goods for export is contained. The price is DM 50.—or equivalent including postage and packing. The book can be obtained from: Gemeinschaftsverlag GmbH, POB 508, Darmstadt/Germany.

"Materiels D'Equipment pour la Recherche et la Production du Petrole"—a new petroleum equipment directory gives references on companies who equip the French industry in exploration and drilling. It shows characteristics, dimensions, specifications and all particulars on the equipment concerned. Some 72 pages give additional data and lists of technical terms in French, English, Spanish, German, Arabic and Russian. Catalog may be obtained from S.E.D.O.M., 10, avenue Hoche, Paris (80)—France —Price: 50 N.F. per copy, plus shipping costs.

New Oklahoma Oil Maps

A new book of special interest to operators with Oklahoma oil and gas interests has just been published by National Petroleum Bibliography, Box 3586, Amarillo. Titled *"Geological Maps—Oklahoma Oil & Gas,"* it is the first reference work to cover structure maps and isopachs of producing areas over the entire state.

More than 500 maps, with a wealth of geological and production data, are carried in the book's 342 large pages. Each is indexed alphabetically by field, then is listed separately in a county index. Price of the volume is $30.00 per copy.

"Petroleum Sourcebook" has just been published by National Petroleum Bibliography, Box 3586, Amarillo, Tex. It is a geographic index to petroleum literature and data, which lists technical articles, papers, maps, books, and special publications of 1959, dealing with each continent, country, and state or province. More than 5,000 references are cited, compiled from the trade press, as well as from publications of professional societies, state and federal agencies, and mapping, statistical and financial institutions. It is priced at $7.50 per copy, and may be ordered direct from the publisher, on approval if desired.

Chapter XX, INSPECTION FOR FIRE PROTECTION, of the *"Guide for Inspection of Refinery Equipment,"* is now available from the American Petroleum Institute. This 17-page chapter covers inspection of all parts of a refinery for conditions which may cause a fire to start, as well as for the physical condition, location, and availability of fire-fighting equipment. Price per copy is $1. Order from the Publications Department, American Petroleum Institute, 1271 Avenue of the Americas, New York 20, N. Y.

International guests of the Houston Chapter, Nomads, gave comprehensive reports of activities in their areas of operation at the regular May meeting of the organization. They are, left to right, Frank Knox, Industrial Agencies Ltd., Trinidad; Jim Bridges, Baash-Ross, Mexico City; P. D. Thomas, Asiatic Petroleum Co., New York; Jose Esomoris, Dalmine Satta, Buenos Aires; Giovanni Conti, Dalmine Satta, Buenos Aires; and Homayoun Beklik, Tesco Ltd., Tehran, Iran.

ELLIOTT 2 hp to 2000 hp YR TURBINES

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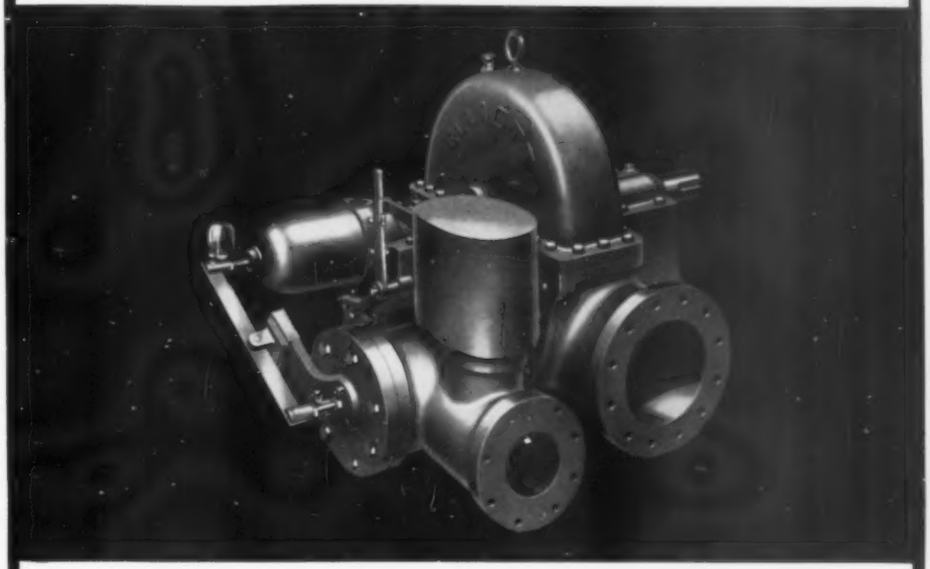
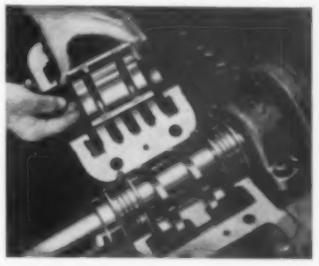


Long-term dependability is of primary importance in small turbines—and that's one reason why Elliott YR turbines are outstanding in their field.

All-weather protection assures dependable operation under all conditions of heat, cold, moisture, dust and contaminated atmosphere. The direct-acting speed-governing system is simple and positive. The rugged rotor assembly is dynamically balanced. Bearings and shaft seals are readily accessible for maintenance. Hand valve reduces steam consumption at partial loads.

Throughout, YR turbine design simplifies installation and operation, encouraging an adequate program of routine inspection and maintenance. For example, the liner-type bearings (right) are easy to inspect and replace.



Other fine products of the Elliott Company include induction motors, synchronous motors, Crocker-Wheeler integral HP motors, motor generators, turbine-generators, ejectors, centrifugal compressors and strainers.

For information on any of these products, send this coupon to Industrial Equipment Sales Dept., Carrier International Ltd., 385 Madison Avenue, New York 17, N. Y.; Carrier A.G., Zurich, Switzerland, or Carrier-Lix Klett S.A., Buenos Aires, Argentina.

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New Halliburton Tank Car

New pneumatic tank-type railway car which carries 2,400 cu. ft. of dry material, discharges directly by jet air pressure and can be unloaded by one man in 30 minutes, has been developed by Halliburton Co. and is being produced and marketed under a cooperative program by Halliburton's special products division and the Pullman-Standard division of Pullman, Inc., Chicago. In photo, the car is unloading flyash at the Ladue, Mo., plant of Western Flyash Co.

Southwest Named Distributor

Southwest Industries, Inc., of Houston, Texas, has been appointed exclusive distributor for the sale and retrofit installation of power-boosting AiResearch turbochargers on existing 2-cycle natural gas engines, by the AiResearch Industrial Division of The Garrett Corp. Territory for Southwest Industries covers Texas, New Mexico, Colorado, Nebraska, Kansas, Oklahoma, Louisiana, Mississippi, Alabama, Arkansas, Missouri and Illinois.

W. W. March

March Retires

International Drilling Co. has announced the retirement of Wallace W. March. Mr. March, together with Mr. Monty Garrison, founded International Drilling Co. and they served as joint managing directors. While retiring from the active management of the company, March will retain his financial interest. He will make his home in Dallas, Texas, and Rolling Hills, Calif.

Kaiser Opens B.A. Office

Kaiser Steel Corp. opened its first foreign sales office at Buenos Aires, Argentina, on August 1. Bernard E. Olsen has been appointed manager of Latin American sales and will move to Buenos Aires to head up the new sales office.

New Pipe Machine

A new pipe cleaning and tape wrapping machine has been developed by Crose-Perrault Equipment Corp., Tulsa, Okla. The machine offers a new design and improved mechanical cleaning of pipe with twisted wire wheel type brushes revolving at high speed.

Self-compensating brushes are long-wearing and economical to replace. Only one head is used, but a counter rotating effect is employed by rotation of the cleaning sprocket and an opposite rotation of wire brushes.

The new machine offers lower fuel consumption and less weight than comparable conventional machines. It can be quickly adjusted from one pipe size to another throughout the range of the machine. Handles pipe from 3 to 6 inch.

New Lubricating Oil Blender

New continuous-flow equipment for precise blending of multiple-ingredient lubricating oils has been announced by Girdler Process Equipment Division of Chemetron Corp. Viscosities of finished products are held to within plus-or-minus 0.2 seconds Saybolt Universal by the new system, which accurately proportions the component base oils and costly additives at rates up to several hundred gallons per minute.

Vokes new filter media with guaranteed 100% efficiency

POROLOY CM.

Vokes now introduce a new all metal filter medium of outstanding efficiency for the *controlled* filtration of hydraulic and lubricating oils, fuels, air, gases, acids, caustics and related caustic materials, chemicals and solvents at extreme temperatures and pressures. Poroloy CM filter elements can be made in any size or shape from a variety of metals—Stainless Steel, Inconel, Nickel, Copper, Steel and Nichrome being the most popular—features which, combined with special production techniques to give controlled pore configuration, enable filters to be individually designed for special applications. Metals can be selected with the particular requirements of the application in mind and the size of the pores can be controlled to deal with particles of between 2 and 250 microns. Poroloy CM filters are therefore 100% effective against a stated particle size, *the danger of media migration being eliminated by an accurately controlled sintering process.* The ultimate tensile strength of the elements varies from 2,000 to 60,000 p.s.i. and the operating temperature range is from —400°F to 1200°F.

The unique combination of properties found in Poroloy CM has led to its recent use in critical temperature conditions in the United States missile and aircraft industries, including installation in the Boeing 707.

POROLOY T.

Similar in performance to Poroloy CM but manufactured by a different process, Poroloy T has an operating temperature range from —400°F to 1500°F. Pore size ratings are from 2 to 250 microns and tensile strength varies from 2,000 to 100,000 p.s.i.

This illustration shows the many sizes and forms—seamless tubes, flat discs, corrugated elements etc.—in which Poroloy can be manufactured.

Both filter elements are manufactured in conditions of micro-cleanliness and before despatch are individually checked for performance in bubble point testing equipment.

Poroloy was developed by the California Institute of Technology and is manufactured in the U.K. under license from The Bendix Corporation, U.S.A.

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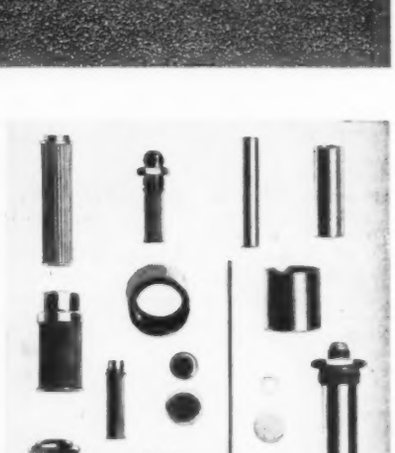

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VAH

ENI's Central Europe Pipeline

A group of companies headed by ENI, the Italian state oil concern, have proposed a Central Europe pipeline which will traverse in all about 1,000 kilometers of flat, hilly and very up-and-down mountainous country in northern Italy, Switzerland, Austria and Germany. The Alps will twice be spanned, using the Great St. Bernard and San Bernardino road tunnels (5,800 meters long and 1,920 meters high and 6,600 meters long and 1,700 meters high respectively). A further 8 kilometers will have to be tunnelled out especially for the pipeline. Thirty important river crossings will have to be made, including the Po, the Rhine and the Danube. The pipeline avoids built-up areas and, together with its ancillary installations, will be built according to international safety standards.

Starting from the new Genoa-Pegli oil port it heads northwards through the Ligurian Apennines, the Po plain and the pre-Alps of the Ticino Canton. Then it crosses the Alps in the Grisons Canton through the San Bernardino tunnel, runs along the eastern boundary of the St. Gallen Canton, cuts across the extreme edge of the Vorarlberg, goes along beside Lake Constance and then over the German plain as far as the Ulm area. Here it divides into two. One branch goes northwest to somewhere north of Stuttgart and the other goes northeast to Ingelstadt. At these two German terminals refineries will be built. A third refinery is going up at Aigle, the arrival point of another branch of the pipeline which, starting from Ferrera in the middle of the Po Valley a few miles north of the river itself, goes westwards as far as Chivasso and then heads northwards following the valley of Aosta and crosses the Alps under the Great St. Bernard Pass and then descends into Valsis to the terminal at Aigle.

Products carried will flow into the three refinery terminals and four depots which, in Italy, will be built at Ferrera and Chivasso (apart from the initial one at Genoa and AGIP's already existing depot at Rho) and, in Germany, at Altheim and in other distribution centers in the Swiss cantons of Ticino, Grisons and St. Gallen and in the Austrian Province of Vorarlberg.

The line will be of various diameters—520 kilometers will be 66 to 56 cms. and 480 kilometers will be 46 to 31 cms. in diameter. Pumping stations with an overall power of 60,000 hp will be installed along the line. The storage capacity of the depots will be around 600,000 cubic meters.

It is planned to have an overall offtake capacity for the various terminals of between 16 and 18 million tons per annum of crude and fuel oil, 5-6 million of these in the Italian, 3-4 million in the Swiss and Austrian and 8 million in the German terminals.

The work is due for completion towards the end of 1963 and involves a capital outlay of about Lit. 50,000 million and a labor force of 8-10 million man hours.

The following four companies are taking part in building the Central Europe Pipeline: SNAM, in the ENI Group, which is building the whole of the Italian part; Oleduc du Rhone S.A., which is handling the Great St. Bernard-Aigle stretch; S.A. Oleodotti del Reno, which is building the stretch from Ponte Tresa to the German border; and Sudpetrol AG, which will complete the pipeline in German Federal Republic territory.

American to Extend Marketing

A heavy program of capital expenditures and a massive advertising campaign will support the American Oil Co.'s entry into the national marketing scene, its president has announced. L. W. Moore, head of the newly-expanded Chicago-based company, also announced plans for extending the company's marketing activities in the Southwest.

The company plans to commit "in this one year alone roughly $100 million in expenditures aimed principally at the modernization, upgrading and addition of facilities across the country and especially in the South and East."

He said American Oil intends to extend its operations as quickly as practicable into areas where it now has sparse representation or none at all—California, New Mexico and Arizona, for example.

"Seven states in the Western and Southwestern sections of the nation are expected to contribute almost 40% of the nation's total forecast population growth in 1980," Moore said. "We mean to be in there with first-class American Oil stations long before 1980."

World's Deepest Frac Job

The world's deepest fracturing job was completed recently for the Atlantic Refining Co. by Dowell Division of The Dow Chemical Co. The well, Lucas State 1, located 25 miles west of Fort Stockton, Texas, was treated through perforations from 16,030 to 16,210 ft in the Devonian formation. Total depth of the well was 17,015 ft.

The well was treated with 145,000 gallons of gelled water and 80,000 pounds of sand at a rate of 33 barrels per minute down the casing, at a maximum surface pressure of 3,500 psi. The bottom-hole temperature of the well was approximately 207 degrees and the treating fluid was heated to 160 degrees before being injected into the well. This was to prevent damage to the cement from contraction and subsequent expansion that would be caused by cold liquid coming in contact with such a high temperature.

The deepest fracture treatment record previous to this was performed early this year in the British-American Producing Co.'s Vera D. Hussy 1-X well near Lindsay, Oklahoma. The treatment was done by Western Co. through perforations open from 15,358 to 15,836 ft. Total depth was 15,860 ft.

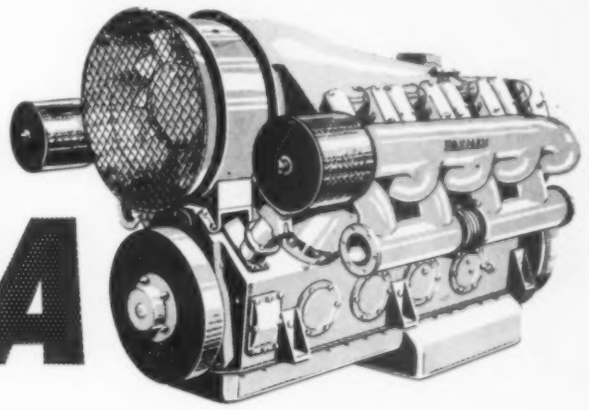
Tankers Feel Impact

Because of USA curtailed oil-import program, tankers go a-begging and make bargain trans-Atlantic carriers for other commodities. For instance, a 30,000-ton tanker recently hauled grain from a Gulf of Mexico port to Antwerp-Rotterdam for only $3.50 per ton against $5.75 six months ago.

Establishes Automation Division

The establishment of a new process automation division has been announced by Electrodynamic Instrument Corp., Houston, Texas, a subsidiary of Reed Roller Bit Co., Houston. The new division designs and supervises installation of process automation systems for pipelines and petrochemical plants.

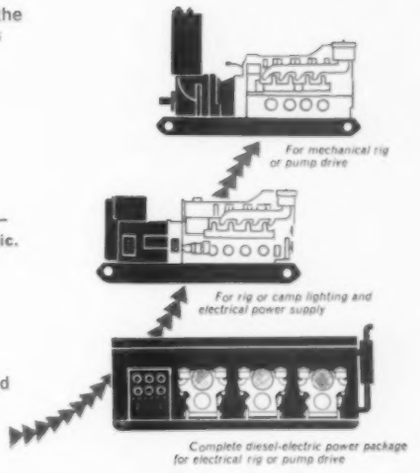
air-cooled
VEGA
the new
profit-boosting diesel



Here are seven good reasons why the Paxman 'Vega' air-cooled diesel cuts costs for the drilling contractor:

★ Less initial cost, by elimination of radiator and accessories.
★ No water supply problems.
★ No freezing problems.
★ Constant top performance and dependability—whether operating in the tropics or the Arctic.
★ Light and easily transportable.
★ Low maintenance.
★ Long Life.

And now, the 'VEGA' is factory-engineered into three standard packaged units for specific power requirements in the oilfields.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PO.7

Sign Licensing Agreement

A reciprocal licensing agreement covering the manufacture of refinery fittings in West Germany and the United States has been entered into by ACF Industries, Inc. and Bergische Stahl Industrie (B. S. I.) of Remscheid. Involved under the two-way agreement are the sale in West Germany of refinery fittings and return bends—under the trade name "KEY"—made by the American company's WKM division in Houston, Texas, and the sale in this country of related B. S. I. products. Designs and technical and engineering assistance on a reciprocal basis also are included in the pact.

Clark Compressors in Japan

Clark's overseas network of licensed manufacturers has been expanded by the addition of Mitsubishi Zosen, Tokyo, according to R. R. McCartney, vice president of overseas operations for Clark Bros. Co., Olean, New York. Mitsubishi Zosen is one of Japan's largest manufacturers of engineered equipment. Sales of Clark compressors built in Japan will be handled through Nippon Clark, a Japanese trading company to be jointly owned by Dresser A. G. and Mitsubishi Zosen.

Mission Has New Turbine

An agreement by Mission Manufacturing Co. to package and sell AiResearch gas turbine engines for oil field use has been announced at Mission's Houston plant. Trade mark of the new Mission-AiResearch team is "Round Power."

More than 1,000 petroleum and industrial leaders witnessed Round Power demonstrations when featured AiResearch gas turbines sand blasted heavily corroded metal to a shiny new brilliance in seconds, cleaned and coated the inside of pipe lines, pumped 550 gpm of water 300 ft. in the sky, and air drilled through solid granite at the remarkable rate of 22½ fphs. Compressor, shaft power and combination gas turbines ranging from 30 to 850 hp were exhibited and operated.

Halliburton Dual Sand Screen

Effective control of sanding problems in upper zones of several dually completed wells in South Louisiana has been reported by Halliburton Co.

The control technique is based on running regular Halliburton Sand Screens opposite the lower zone and the company's new dual completion screen opposite the upper zone. Production from the two zones is kept separate.

The California Co. and Gulf Oil Corp. have used these two types of screens in their completion techniques in dual wells in such fields as Bully Camp, Romero Pass, West Delta, Bay Marchand and Ship Shoal.

Basic construction of both types of screens is identical—an outer layer of consolidated sand held in place around a mandrel of slotted tubing. However, the dual completion screen incorporated dual strings of tubing; one is slotted and receives the production from the upper zone and the other (unslotted) carries fluid from the lower zone.

Halliburton engineers report two advantages gained from this sand control technique. First, the sand screen is itself the screening medium. Sand produced from the formation tends to diffuse over the entire surface of the screen, rather than concentrating at restricted points of entry. Sand is an ideal exclusion material because it acts as a natural buffer, is inert and compatible with produced fluids under downhole conditions.

Second, cost is reduced and less installation time is required than consolidation treatments of the formation's demand.

New Tool for Freeing Strings

A new tool for use in freeing stuck downhole strings has been introduced by Bowen Itco, Inc. of Houston. The Bowen Surface Jar, operating from the surface, transmits a sharp downward impact or jar to the downhole string. A simple adjustment allows the impact force to be varied from a very light blow of 3,000 psi up to a tremendous stroke of 50,000 psi. Length of the stroke is 48 inches.

The Bowen Surface Jar is particularly useful in freezing any stuck downhole string—either drilling, fishing, or washover—which does not respond to conventional procedures. It is used to free keyseated drill pipe and drill collars; to actuate drilling bumper subs, bumper safety joints or other downhole bumping tools; or to release grappling tools, such as overshots or spears, when the grapples or slips have become imbedded in the fish or have become fouled because of prolonged downhole jarring.

JACK JORDAN AMMANN

Jack J. Ammann, president and chairman of Jack Ammann, Inc., photogrammetric engineers, died at his home in San Antonio, Texas, on June 14. He had been engaged in aerial surveying activities soon after his graduation from the University of Texas in 1932. He purchased Kargyl Aerial Surveys in 1940 and changed the name.

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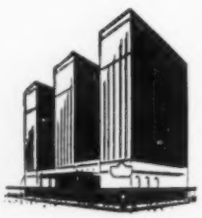

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New Kerr-McGee Rig

Negotiations with Avondale Shipyards, Inc., of New Orleans, have been completed by Kerr-McGee Oil Industries, Inc., to construct an offshore mobile drilling device that will be capable of operating in 175 ft. of water. The new unit will cost approximately $6.5 million. The design incorporates the basic concept which has been so successfully used in Kerr-McGee Rigs 46 and 47. The drilling unit will be known as Kermac Rig 54. It will be triangular in shape with 30 ft. diameter stabilizing columns located at each of its three corners. The dimensions will be 330 ft. on the sides with the working level 200 ft. above the mud line. Each corner will have triangular lower hull footings which approximate 100 ft. on the sides with a depth of 20 ft. from top to bottom.

Not Trade—But Extortion

Socony Mobil's president Nickerson has assailed Russia's policy of subsidizing cut-rate oil exports to noncommunist countries, in the Soviets' drive to win noncommunist customers now being supplied by Western oil companies, on the ground this exacts extra stiff prices from Russia's own satellites. Average crude prices of $1.80 per bbl are being offered by the Soviets to Free World customers against $3.02 which Russian satellite countries must pay, according to Nickerson, who maintains that "what the Russians are doing is selling or bartering crude oil and petroleum products at cut-rate prices that serve their purpose of economic penetration followed by political infiltration." The most dangerous aspect of Russian oil is "price," not volume, declares Nickerson—who says the Soviet Union currently is moving oil into Western Europe and the Mediterranean area at the rate of 325,000 b/d.

Humble to Market in Mississippi

Humble Oil & Refining Co. has announced expansion of its marketing operations into Mississippi where it is establishing service-station outlets selling Esso branded products. Up to this time Humble, the largest domestic oil company, has not marketed its products under its own brands in Mississippi and several other Southeastern states.

Jersey Opposes Tax Change

The Administration's basic proposals for changes in the taxation of U. S. foreign investment "would fail to stimulate domestic investment, impair the U. S. balance of payments, render more difficult the job of assisting in the economic progress of the developing nations and weaken, rather than strengthen, the economic unity of the free world." Emilio G. Collado, a director of Standard Oil Co. (New Jersey), testified before the Ways and Means Committee of the House of Representatives.

Mr. Collado said that the changes "would be in conflict with the objectives of U. S. foreign economic policy which has been consistently directed toward encouraging international trade and investment and promoting the economic development of underdeveloped countries."

Mr. Collado said that "a policy designed to reduce our rate of foreign investment is singularly inappropriate as a remedy for our balance of payments problem." He found no reason to believe that private U. S. foreign investment could be re-directed from the industrially-developed to the developing countries because the location of foreign investment is largely determined by basic considerations of markets, costs and source of supply. Mr. Collado said that such investments will not be affected by marginal tax incentives. He added that in such industries as petroleum, investments in the industrially-advanced countries are required to provide markets for the output of developing countries.

The proposal to levy a tax against shareholders on undistributed earnings of bona fide subsidiaries is, said Mr. Collado, contrary to U. S. income tax principles of long standing and is without precedent in any of the industrialized countries of the world. Many countries, he said, offer tax inducements to encourage foreign investment by their nationals. The Administration proposals, Mr. Collado said, if enacted "would inevitably discourage U. S. investment in the less-developed parts of the world and thereby strengthen the tendency, already evident in many of these countries, to move away from the free market economy towards increased reliance on government ownership and control."

Lummus Names Three

The Lummus Co. has appointed three sales engineers to expand its senior sales staff. The new appointees to the central sales department include Robert M. Cornforth, formerly national sales manager for Information Systems; Marvin M. Ramer, formerly district manager of the Blaw-Knox Co.; and John J. Schottinger, formerly a project manager for the Ralph M. Parsons Co. All will make their headquarters at Lummus' main office in New York City.

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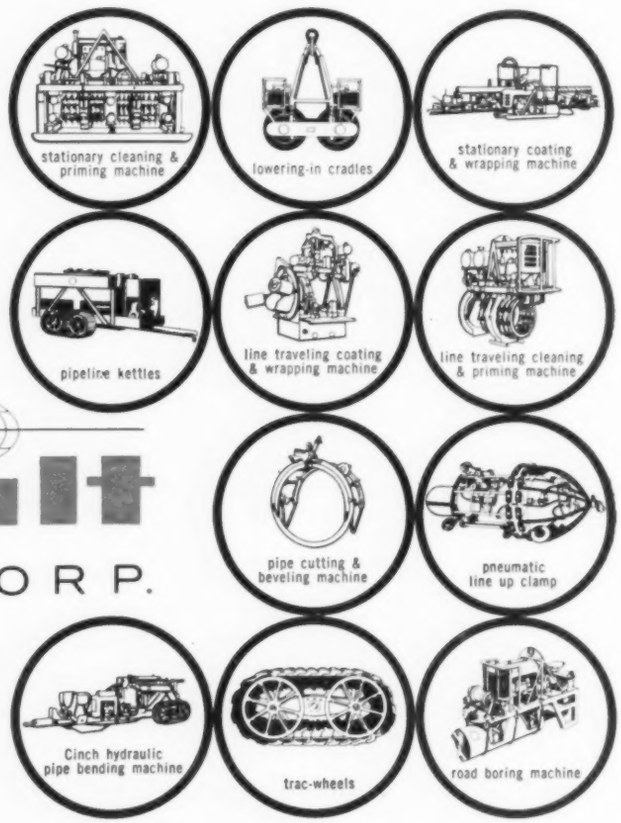
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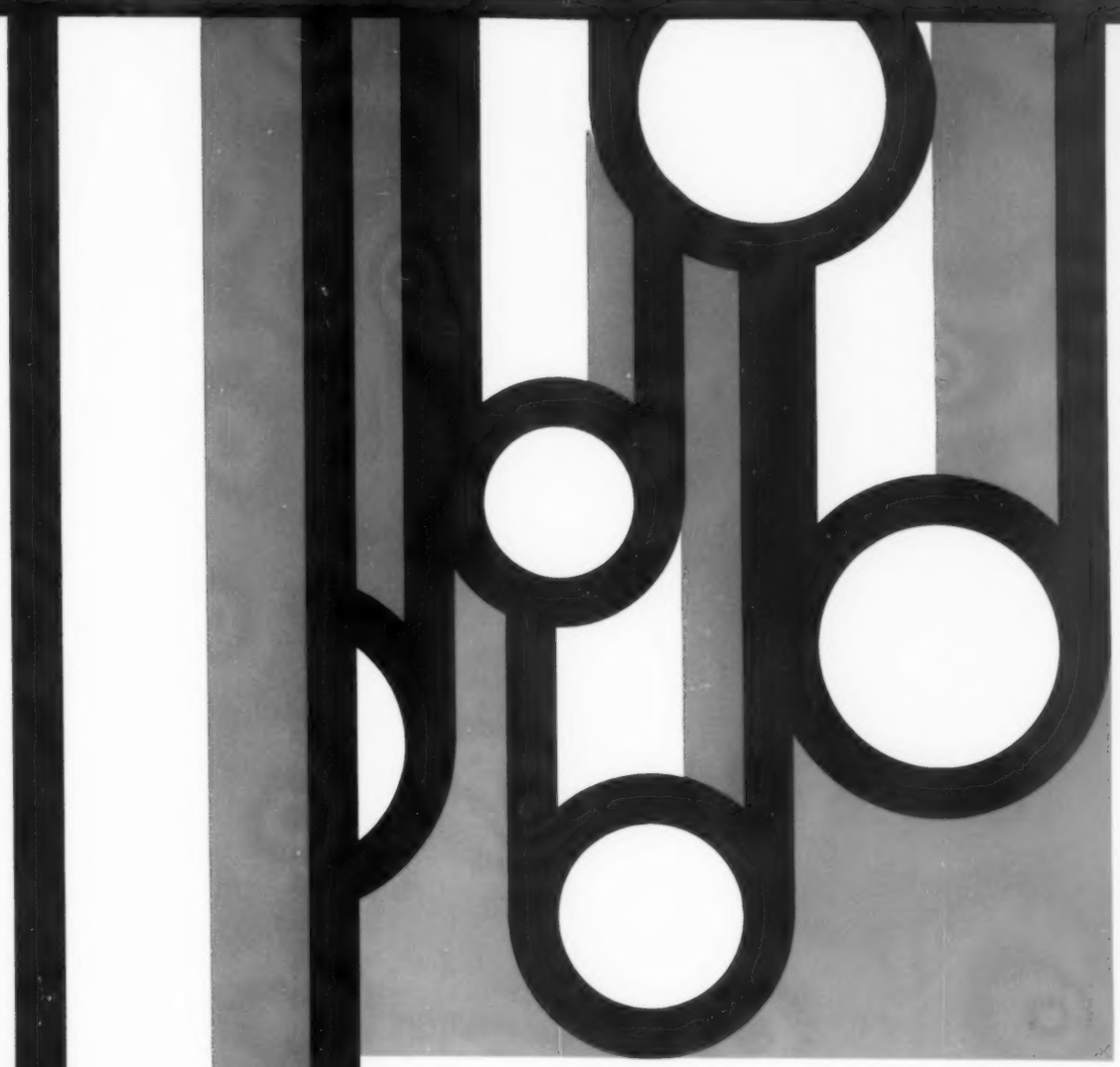

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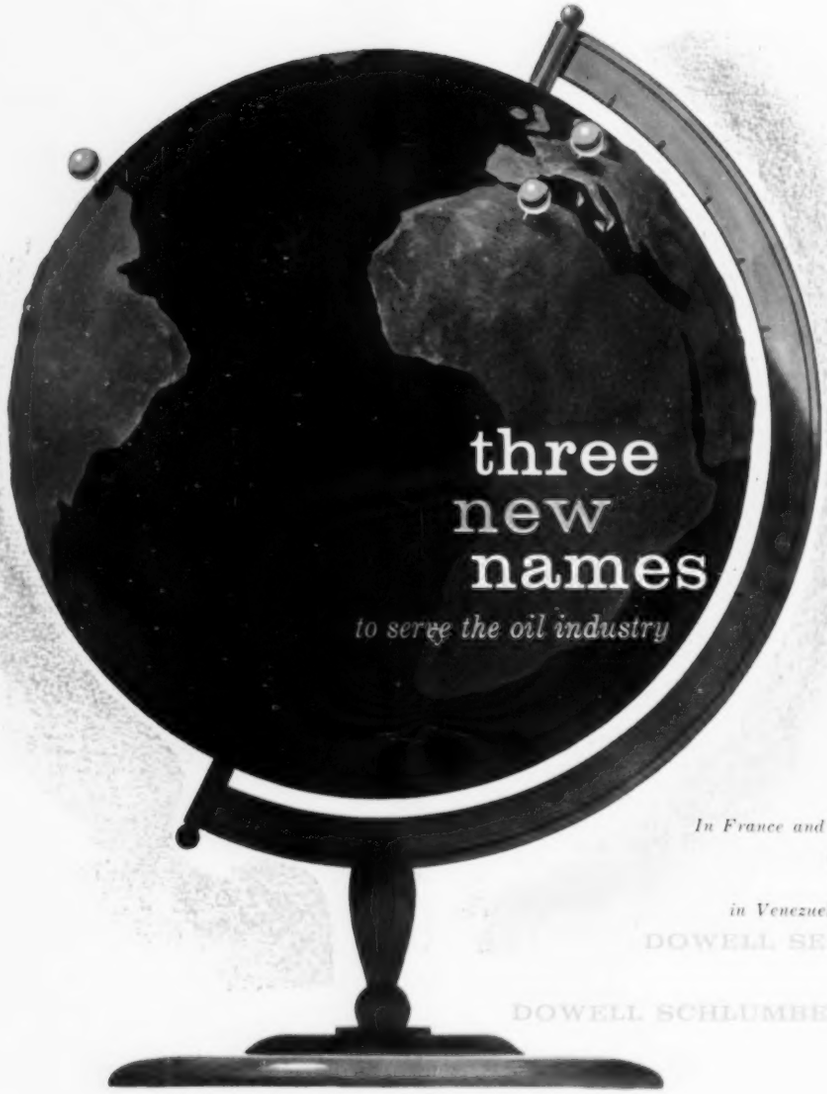

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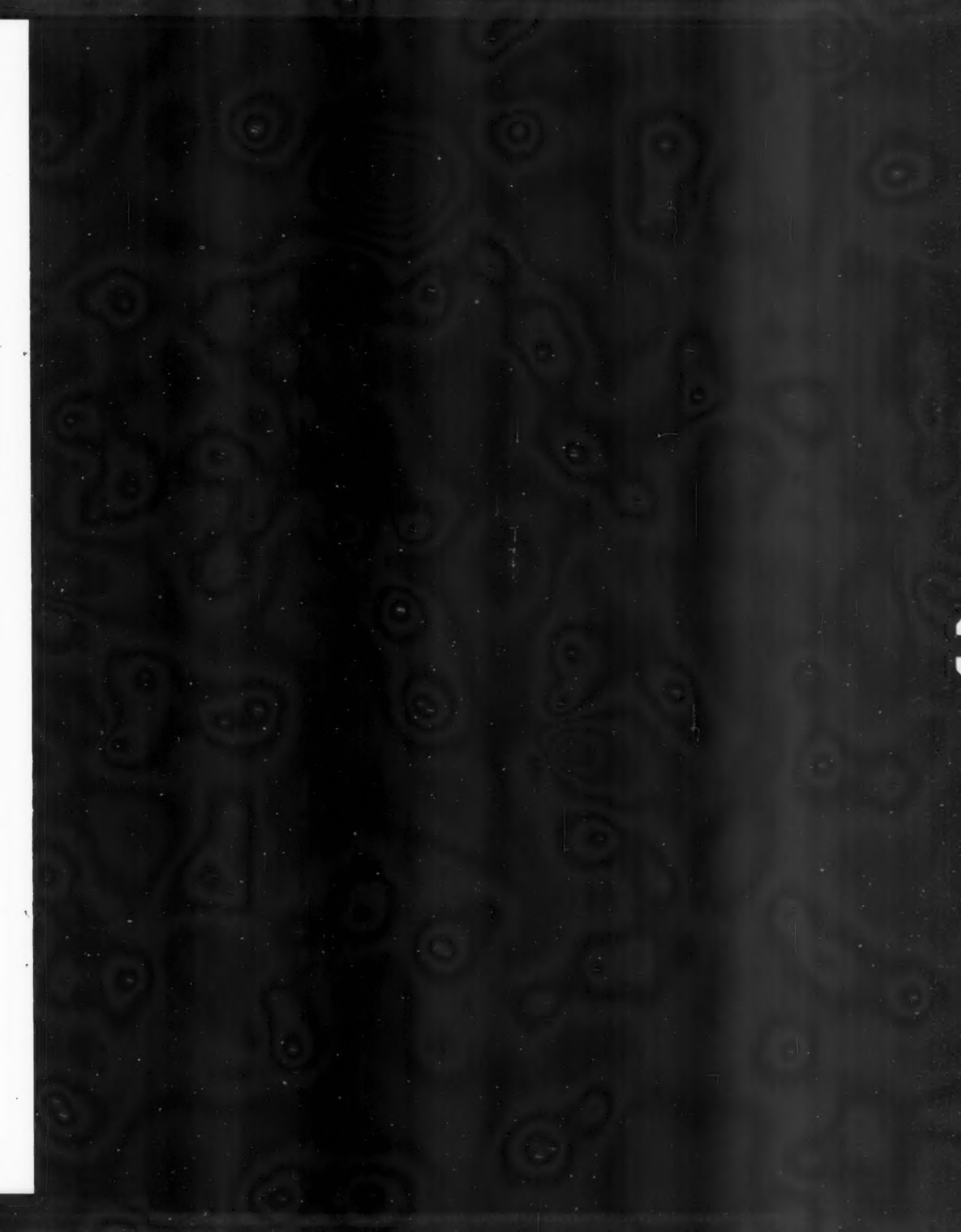
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